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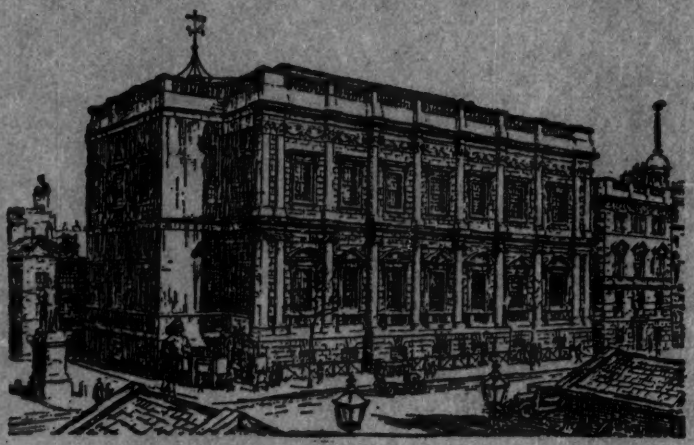

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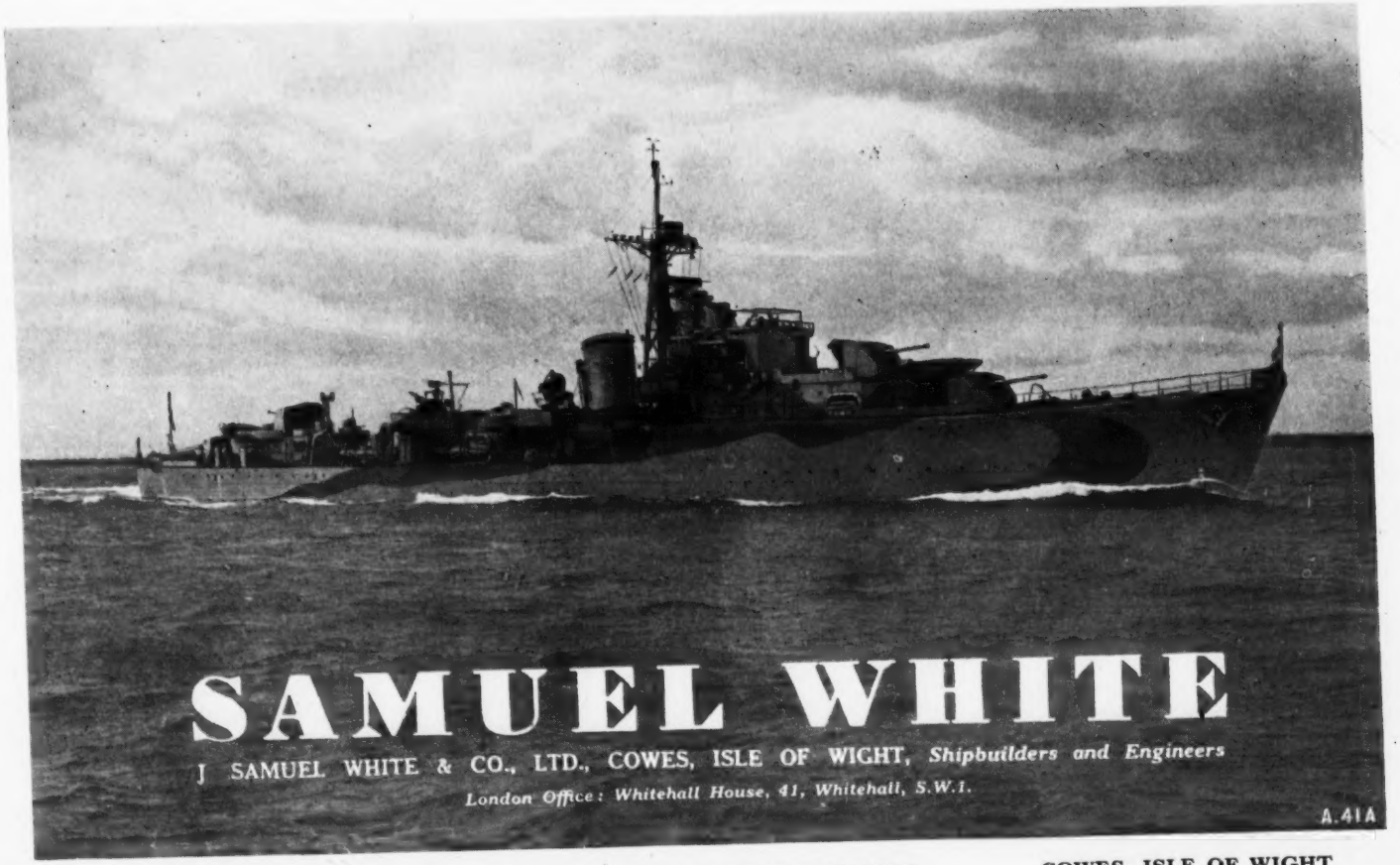
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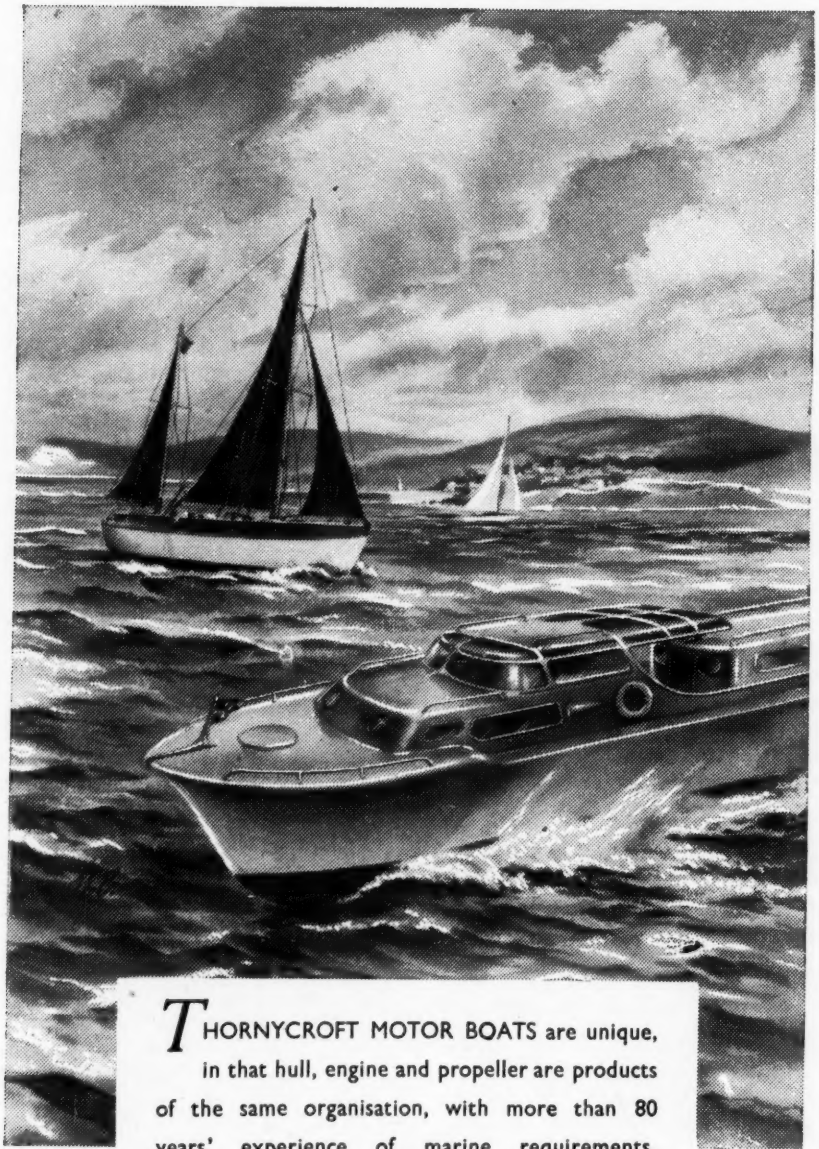

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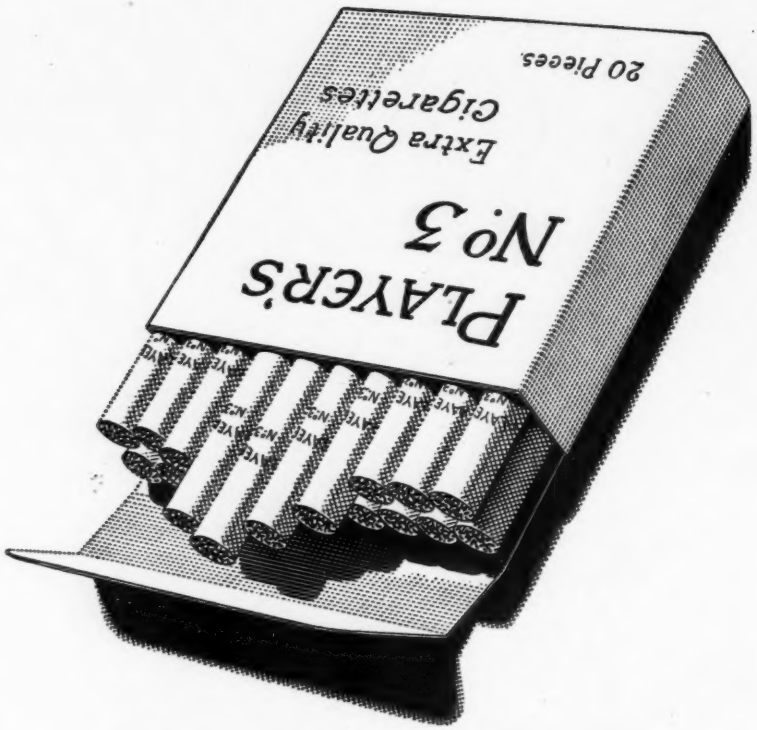

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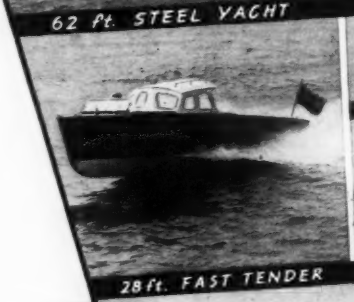

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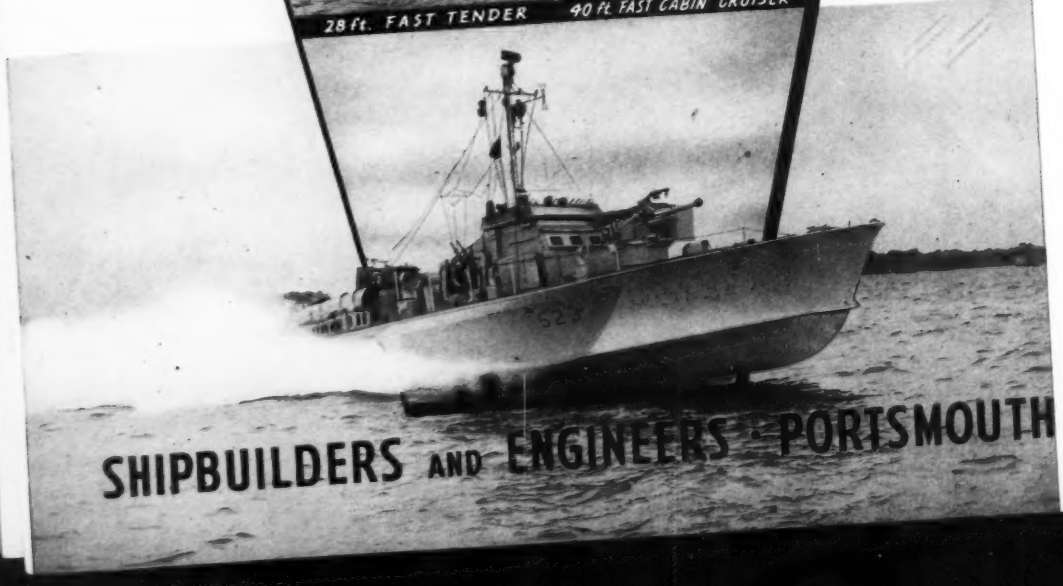

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Lieut.-General Sir John T. Crocker, K.B.E., C.B., D.S.O., M.C., has been elected a Regular Army Member of the Council in the vacancy caused by the resignation of Lieut.-General Sir Thomas Riddell Webster, K.C.B., D.S.O.

Air Vice-Marshal G. H. Ambler, C.B., C.B.E., A.F.C., has been elected the Auxiliary Air Force and Royal Air Force Volunteer Reserve Member of the Council in the vacancy caused by the resignation of Air Commodore Lord Willoughby de Broke, M.C., A.F.C.

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Admiral Sir John Cunningham, G.C.B., M.V.O., has accepted the invitation of the Council to become an Ex-officio Member on taking up the appointment of First Sea Lord and Chief of Naval Staff.

Field Marshal the Viscount Montgomery of Alamein, G.C.B., D.S.O., has accepted the invitation of the Council to become an Ex-officio Member on taking up the appointment of Chief of the Imperial General Staff.

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O-Cadet R. M. Sefton-Browne, R.E.
Lieut.-Colonel G. R. D. Fitzpatrick, D.S.O., M.B.E., M.C., The Royals.
Captain B. A. Hobson, The Kings Shropshire Light Infantry.
Major P. I. C. Payne, The Royal Scots.
Lieut.-Colonel J. W. Smith-Ainsley, Royal Signals.
Major G. W. Vero, Royal Signals.
Lieut.-Colonel P. G. Cane, M.C., 9th Gurkha Rifles, I.A.
Major R. G. Tooth, M.C., Royal Artillery.
Lieutenant Simon Hutchinson, Grenadier Guards.
Major J. L. Pern, Royal Armoured Corps.
Major D. H. Cunningham, Canadian Army.
Captain P. D. T. Hawker, Royal Engineers.
Captain M. T. Hildyard, M.B.E., M.C., Notts. S.R. Yeomanry.
Lieut.-Colonel F. J. Swainson, Royal Signals.
Captain T. D. Grocock, Royal Tank Regiment.
Major B. H. T. Barlow-Poole, M.C., The Lincolnshire Regiment.
Major I. H. F. Boyd, Royal Engineers.
Lieutenant M. F. Cunliffe, Royal Tank Regiment.
Major L. M. Dale, D.S.O., M.C., The Royal Fusiliers.
Captain H. P. Edwards, R.A.S.C.

Major R. L. Allen, Indian Army.
Major R. H. W. Pengelly, M.B.E., R.A.S.C.
Major J. R. M. Curling, M.C., Royal Artillery.
Major I. E. Jacques, M.B.E., The East Lancashire Regiment.
Lieutenant P. C. Stockford, Royal Artillery.
Captain P. B. Chambers, M.C., The Hampshire Regiment.
Major R. F. F. Gillespie, The South Wales Borderers.
Captain R. D. Hutton, M.C., Royal Engineers.
Major H. H. Millward Marston, M.C., 2/7th Gurkha Rifles, I.A.
Captain G. A. Dowland, Royal Engineers.
I. Lloyd Phillips, formerly Lieutenant, Herts Regiment T.A.
Lieut.-Colonel D. J. P. Weld, R.I.A.S.C.
Major M. McClure Williams, Royal Artillery.
Lieutenant R. I. A. Hughes, 1st Royal Gloucestershire Hussars.

ROYAL AIR FORCE

Squadron Leader T. S. Kitching, D.F.C., R.A.F.
Wing Commander T. B. de la P. Beresford, D.S.O., D.F.C., R.A.F.
Wing Commander R. C. Keary, R.A.F.
Squadron Leader D. G. Lyster, D.F.C., A.F.C., R.A.F.
Squadron Leader J. S. Rowlands, M.B.E., R.A.F.
Squadron Leader I. S. Smith, D.F.C., R.A.F.
Flight Lieutenant P. T. G. Snasdell, R.A.F.V.R.
Wing Commander F. W. Thompson, D.S.O., D.F.C., A.F.C., R.A.F.
Group Captain J. N. H. Whitworth, D.S.O., D.F.C., R.A.F.
Wing Commander J. F. Roulston, C.B.E., D.S.O., D.F.C.
Wing Commander C. J. Salmon, O.B.E., R.A.F.
Air Commodore H. D. McGregor, C.B.E., D.S.O.
Wing Commander N. C. Harding, D.F.C., R.A.F.
Group Captain H. A. V. Hogan, D.F.C., R.A.F.
Flight Lieutenant T. G. Hampsheir, R.A.F.
Group Captain A. A. Case, O.B.E., R.A.F.
Squadron Leader A. D. Jackson, R.A.F.
Flight Lieutenant A. R. Miller, R.A.F.V.R.
Flight Lieutenant T. A. Whiting, D.F.C., R.A.F.
Wing Commander B. G. Morris, R.A.F.
Air Vice-Marshal G. H. Ambler, C.B., C.B.E., A.F.C.
Air Commodore J. R. Whitley, C.B., C.B.E., D.S.O., A.F.C.
Wing Commander J. A. O'Neill, D.F.C., R.A.F.
Wing Commander G. B. Walford, R.A.F.
Group Captain J. F. Hobler, C.B.E., R.A.F.
Wing Commander P. C. Fletcher, O.B.E., D.F.C., R.A.F.
Squadron Leader D. E. Davies, D.F.C., A.F.C., R.A.F.
Squadron Leader S. L. Swain, R.A.F.

COVENANTED SUBSCRIPTIONS

The Council hope that many more Members will support the Scheme for Covenanted Subscriptions, details of which have been circulated to all Members.

This materially assists the Institution because it enables Income Tax at the full current rate to be reclaimed on each subscription.

To date, 548 Annual and 107 Life Members have signed the necessary Deeds.

Any Member who has not received his copy of the Scheme or who requires new forms is requested to communicate with the Secretary.

LIAISON OFFICERS

The following alterations to the list of Liaison Officers published in the February, 1946, JOURNAL, as amended in the May 1946, JOURNAL, have taken place :—

NAVY

Commander R. M. Aubrey, D.S.C., R.N. ...	Combined Operations Headquarters.
Lieut.-Commander H. H. Mulleneux, D.S.C., R.N.	School of Combined Operations, Fremington.
Captain I. S. Harrison, R.M.	R.M. Barracks, Eastney.
Major D. B. Drysdale, R.M.	R.M. Commando Group, Faringdon.

ARMY

Lieut.-Colonel J. Sorel-Cameron, D.S.O.	Eastern Command.
Lieut.-Colonel R. F. Johnstone	Southern Command.

AIR FORCE

Wing Commander A. P. Campbell, C.B.E. ...	Bomber Command.
Wing Commander W. M. Bisdee	Technical Training Command

February, 1946 JOURNAL—R.A.F. Overseas—Amend name of Liaison Officer for South East Asia Air Command to read :—

Air Commodore J. R. Whitley, C.B., C.B.E., D.S.O., A.F.C.

TRENCH GASCOIGNE PRIZE ESSAY COMPETITION, 1946

Subject

The following subject has been selected for the Trench Gascoigne Prize Essay Competition (Three Services) 1946 :—

> " How can the lessons learnt from the development of the Services in organization and technique since 1939 be applied most efficiently to the solution of Imperial Defence problems ? "

A copy of the rules can be supplied on application to the Secretary.

JOURNAL

Members are invited to offer suitable contributions for the JOURNAL. Confidential matter cannot be used, but there is ample scope for professional articles which contain useful lessons of the War; also contributions of a general Service character, such as Strategic Principles, Command and Leadership, Morale, Staff Work, Naval, Military and Air Force history, customs and traditions.

The Editor is authorized to receive articles from serving officers, and if found suitable, to obtain permission for their publication from the appropriate Service Department. Army Officers are reminded that such articles must be accompanied by the written approval of the author's Commanding Officer.

Request for Back Numbers

The Editor will be grateful for any copies of the JOURNAL for February and May, 1941, and February, 1939, which Members may have finished with, in order to meet applications for these numbers.

LECTURES

The following lecture and film meetings, at 3 p.m., have been arranged up to the end of the year :—

Date	*Subject*	*Lecturer*
October 9th ...	The Strategy of the South East Asia Campaign.	Admiral Lord Louis Mountbatten, G.C.V.O., K.C.B., D.S.O., A.D.C.
October 23rd ...	The Luftwaffe and its Failure ...	Air Vice-Marshal Sir Thomas Elmhirst, K.B.E.
October 30th ...	In Occupied Japan (Coloured Film).	Commentary by Mr. William Courtney.
—	The Battle of the Atlantic ...	Admiral Sir Max K. Horton, K.C.B., D.S.O.
November 13th ...	The Radio War	Air Vice-Marshal E. B. Addison, C.B., C.B.E.
- - ...	Carrier Aircraft in Support of Major Landings	Rear-Admiral G. N. Oliver, D.S.O.
November 27th ...	The Final Offensive in Italy ...	Lieut.-General Sir Richard McCreery, K.C.B., K.B.E., D.S.O., M.C.
December 4th ...	The Co-ordination of Imperial Defence.	Field Marshal The Viscount Alanbrooke, G.C.B., D.S.O.
—	Air Films—" Operation Varsity " (Airborne Crossing of the Rhine), etc.	

NOTE.—As seating accommodation in the theatre is limited, Members are advised to apply for tickets of admission for which there will be no charge.

If more applications are received than the number of seats available, a ballot will take place, and Members who have been unsuccessful will be informed.

In applying for tickets, Members should state whether they wish to bring Guests. Not more than two Guests can be invited at a time and if there is a ballot it may be necessary to limit the total number of Guests.

MUSEUM

Restoration of the Banqueting Hall.—The Banqueting Hall is closed to enable the Ministry of Works to replace the Rubens ceiling. This will take some months but it is hoped that part of this section of the Museum will be open before the end of the year.

Exhibition in the Theatre.—The Exhibition of some of the exhibits from the Banqueting Hall showing in the Theatre during the summer months, will be closed at the end of September in preparation for the Lecture Session.

War Relics.—Members and others interested in the R.U.S. Museum are requested to keep a look out for war relics. Considerations of space preclude the acceptance of anything except small articles of particular historic interest. Personal relics of special distinction will be very acceptable.

ADDITIONS

GIFTS

Small Nazi flag formerly the property of the German Major-General Wagener, the last German Commander-in-Chief East Aegean Area, who surrendered on 8th May, 1945. Given by Captain W. McGee, M.M.

Six silver beakers and tray. U-boat officers were given one of these beakers for each successful cruise up to six and then the silver tray for the seventh cruise. Given by Captain E. R. Conder, D.S.O., D.S.C., R.N.

Peninsular General Service Medal, with clasps for Toulouse, Sebastian, Vittoria and Egypt, which belonged to Private William Dobbs. Given by H. Davidson, Esq.

Silk Sash and Miniature of Captain Robert Blake who was present at Preston Pans, 1745. Bequeathed by V. B. Crowther-Beynon, Esq.

Models of "Landing Craft Tank, Mk. IV," "Landing Craft Flak, Mk. IV," "Landing Craft Tank Rocket, Mk. III" and "Landing Craft Gun (Large), Mk. IV." Purchased.

Peninsula General Service Medal with clasps for Busaco, Fuentes d'Onor, Rodrigo, Vittoria and Pyrenees, of Private James Kennedy, 88th Foot. Given by Major H. S. Goddard.

Commemoration Medal for the Battle of St. Vincent, February 14th, 1797. Given by S. D. Gladstone, Esq., M.C.

Coloured Engraving of the 10th Hussars at the Battle of Waterloo. Given by Air Commodore J. Silvester.

Case containing four trays of 49 German Decorations and Badges. Given by the War Office.

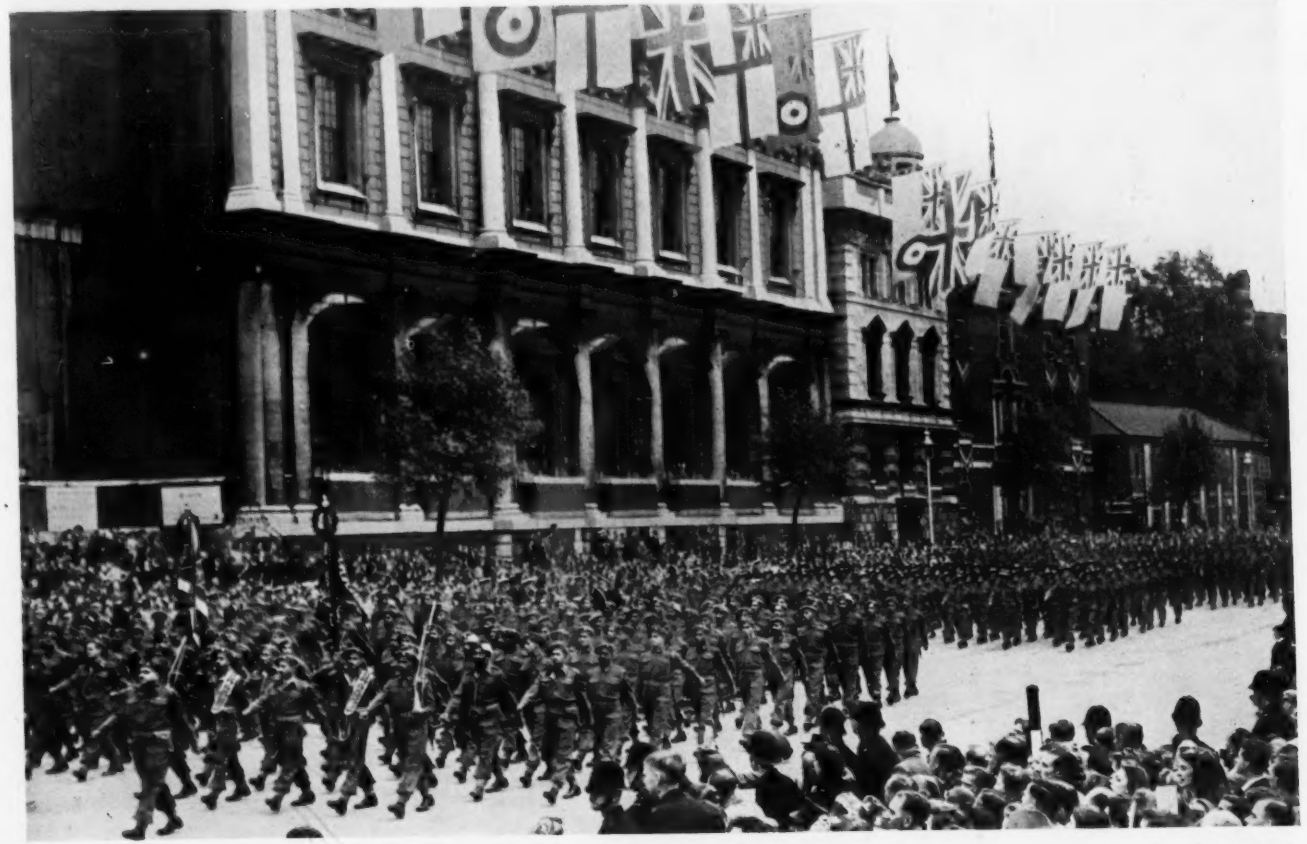
Set of 31 Rank Insignia of the Japanese Army and Navy. Given by the War Office.

Loan

Sword of Lieut.-General Katamura Shihashi, Commander of the Japanese 15th Army in the Burma campaign. Lent by the British 2nd Division.

Silver medal, in gold and glass case, struck in commemoration of the Victory of the Nile, 1798. Lent by Major F. A. Yorke, M.C., R.A.

Two swords of a Japanese Vice-Admiral and Major-General surrendered to Rear-Admiral Sir Cecil Harcourt, K.C.B., C.B.E., on the re-occupation of Hong Kong on 6th September, 1945. Lent by Vice-Admiral Sir Cecil Harcourt, K.C.B., C.B.E.



THE VICTORY PARADE—8TH JUNE, 1946
EMPIRE TROOPS PASSING THE ROYAL UNITED SERVICE INSTITUTION

By courtesy of The Times

THE JOURNAL
of the
Royal United Service Institution

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[Authors alone are responsible for the contents of their respective Papers. All communications, except those for perusal by the Editor only, should be addressed to the Secretary, Royal United Service Institution.]

SCIENCE AND THE SERVICES

By Sir Henry T. Tizard, K.C.B., A.F.C., F.R.S.

On Wednesday, 27th March, 1946, at 3 p.m.

The Rt. Hon. Lord Hankey, G.C.B., G.C.M.G., G.C.V.O., in the Chair.

The Chairman: The Royal United Service Institution is extremely fortunate this afternoon in having as its Lecturer Sir Henry Tizard, the President of Magdalen, a scientist of such repute that you do not want very many words from me to introduce him. A Fellow of the Royal Society himself, he is the son of a Fellow of the Royal Society, Captain T. H. Tizard, R.N.

After a distinguished career at Oxford, Tizard served in the last war, first in the Royal Garrison Artillery in 1914 and later turned over to the Royal Flying Corps; that was in 1915. So he is a practical gunner and a practical airman.

Sir Henry came to the fore as an outstanding scientist when he became Assistant Controller of Experiments and Research in the Royal Air Force in 1918. Soon after that he became the Permanent Secretary of the Department of Scientific and Industrial Research, which is certainly one of the highest scientific appointments under the Crown. He left that in 1929, I think, to become Rector of the famous Imperial College of Science and Technology. Then he became Chairman of the Aeronautical Research Board in 1933, and continued in that post until 1943. From 1941 to 1943 he was a member of the Council of M.A.P., and at the same time an additional member of the Air Council. That is a very remarkable feat—to be on two Councils at once—and I should attribute it to the fact that Tizard had the knack of getting things done. If a young airman reported some peculiar behaviour in a machine that could not be diagnosed, Tizard would go up in the machine himself and discover what it was all about. But, more than that, all who know him will agree that he is, by instinct, a person who has the strategical sense, and is therefore one whom Admirals, Generals and Air Marshals are only too glad to consult. It is from that that he became a pioneer in the operational work of a scientist.

I could go on for ages telling of the things I have seen myself in his work, but I am only going to mention one point, namely that, as announced in Parliament at the time, he was Chairman of the small Committee of Scientists in 1935 that put radiolocation across to the British Government, and you all know what a tremendous factor that became for all the Services in winning the War, and for all kinds of operations.

The experimental development of radio-location took place at Bawdsey Manor, I think it was called, in Suffolk, and perhaps Sir Henry will remember that the following motto was written over the portals: "Plutôt mourir que changer," which is interpreted "Rather die than change"!

LECTURE

IN preparing this lecture I have been made acutely conscious of a serious gap in our literature. Nowhere will you find a critical comprehensive study of the influence of science and invention on war. Military historians seem never to have grasped its importance. I know of no good book on the subject which can be read with profit by officers attending Staff Colleges; no writings that will help to mature the judgment of men destined to high command. I wish that such a book could be written. It is hard indeed to think of an author with the knowledge and capacity to write it; and harder still to think of anyone with the necessary leisure. But it ought to be done. There are some chapters that I should enjoy writing myself; for instance, a chapter on the misleading effect of such well-known slogans as "morale is to material as five to one," or "offence is the best means of defence," or—the latest of them all—"scientists should be on tap but not on top." Beware of slogans; they catch the imagination and ruin the judgment.

For many centuries past invention has had a much greater influence on war than has organized science. It is only recently that the methods of science, as distinct from the tangible products of scientific research, have been applied to the problems of war; and only in the war that is just over have they been deliberately applied on a comprehensive scale. But there are records of the organization of science for war in China and Egypt in ancient times. Gunpowder is said to have been used in China in the Vth Century, but it was not until the XIVth Century that it was manufactured in England. Exactly six hundred years have passed since Edward III decided to control the supplies of sulphur and saltpetre for the manufacture of gunpowder, and now we observe how our Government intends to control the supplies of uranium and other radio-active minerals. So history repeats itself on a grander scale.

Gunpowder swayed the fortunes of battle for five hundred years. Thomas Carlyle said that gunpowder, printing, and the Protestant religion were the three great elements of modern civilization; and a cynic has remarked that gunpowder had the greatest influence of the three. It began to be replaced by better explosives about a hundred years ago, when guncotton was invented. From then onwards there has been a steady increase in the efficiency of explosives, brought about by continuous organized research in which the Royal Arsenal at Woolwich has taken a prominent part. These researches culminated before the War in the remarkable development of R.D.X. Nevertheless, the tactics and strategy of war have remained practically unaffected by improvements in explosives; there has been no revolutionary discovery until the atomic bomb appeared, too late to affect the issue of the recent war but in good time to make us realize that wars of the future may be very different from wars of the past.

It is not possible to define precisely when science began to be organized for purposes of peace and war. In this country it is convenient and sufficiently accurate to date the organization of science from the formation of the Royal Society nearly three hundred years ago. But the Royal Society was not concerned at all with problems of war when it was founded. It was originally formed by a group of scientists who were sick of the commotion of the Civil Wars and who collected together to discuss in common matters of more abiding interest. Its Royal Founder—Charles II—had faith in science, and tried to direct the attention of the Society to matters of practical importance to the Navy. He told Thomas Hooke and Sir William Petty to study the design of ships. Just as the design of naval ships in our time is influenced by the

fact that they must be prepared to fight in any seas of the World, so in Charles II's time the sailing ships of the day had to be prepared to fight the Dutch in the shallow waters of the Scheldt and the French in the comparatively deep and open waters of the Bay of Biscay. This introduced technical problems of considerable difficulty. Scientists were engaged on various schemes for building ships with double and movable keels. Sir William Petty designed one with two parallel keels, which was considered so promising that a committee was appointed in 1663 to examine it and to arrange for trials. But the experiment came to an abrupt end; the Admiralty intervened and said that as the matter of navigation was a State concern, it was not proper for it to be managed by the Society. I imagine that the Fellows of the Society turned with a sense of relief to problems of their own choosing.

Even in the time of Pepys—the saviour of the Navy and a President of the Royal Society, the Society was seldom consulted. Human nature changes very slowly; and then, as now, practical men felt that they could get little help from inexperienced scientists. The practical sailor of the day thought he knew all about the sailing and design of ships; he resented the idea that any outsider could improve on his experience. But when he was confronted with something mysterious, some problem which had not been solved even apparently by practical experience, such as position finding at sea, he would turn as a last resort to the scientist. So it came about that the Society was again engaged on the study of navigation, this time in the narrower sense in which we use the word to-day. All naval men, I suppose, know the story of the time: how Flamsteed was appointed the first Astronomer Royal; how the Treasury refused to supply him with instruments, the cost of which he had to try to meet from his modest salary of £100 a year; how the Admiralty subsequently offered a large money prize for the design of an accurate chronometer; and how Harrison, who fulfilled all the conditions, had to wait for thirty years to get the prize out of them. He got his last instalment in 1773.

There was a significant event in 1795. The Hydrographic Office was founded under pressure from the East India Company. Was this the first scientific department within the fighting Services? I think so. It has steadily enhanced its reputation and has always been closely associated with the Royal Society. But for a long time navigating officers, or any officer who had scientific interests, were looked down upon in the Navy. Lord Hankey has referred to my father. He had to join the Navy in 1854 as a Master's Mate, and some years elapsed before he became a fully Commissioned Officer. In the famous voyage of H.M.S. "Challenger" there was only one officer on board, besides himself, who could find the position of the ship at sea. Things are very different now, but, if we are to study to improve, it is important always to bear in mind the natural tendency of the highly capable practical man to resist the introduction of new ideas and methods outside his own experience. A short time before the War a famous Admiral, now dead, for whom all had the very greatest regard, said to me on one occasion when he was doubtless justly irritated by a provocative remark of mine: "I'll tell you what I think of scientists. I regard them as mechanics. They've got to do what I want done, and nothing else." In other words: "Theirs not to reason why, theirs but to do and die." But later on he withdrew the remark in the most handsome way possible.

THE XIXTH CENTURY

During the XIXth Century there were very great changes which affected the Navy even more than the Army. There was, for instance, the introduction of steam power, which entirely revolutionized the Navy and naval tactics. It is as well to

remember nowadays that the change from wooden sailing to iron steam ships was greeted with horror by most thinking Englishmen at the time. "Steam," they said, "has bridged the Channel; the Navy is no longer our sure defence." A naval historian—David Hannay, remarked of this that "it was an intelligible, perhaps pardonable, example of the confusion produced by a novelty of unproved capacity on the minds of those who were not prepared to consider it in all its bearings." There is nothing new in this; over and over again in history you will find the same attitude of mind when new inventions occur. Before the recent war there were many distinguished officers of the Royal Air Force who were prepared to argue, with considerable outside support, that advance in aeronautics had made the battleship obsolete, and that the Navy was no longer our sure defence; just as there were many distinguished Admirals who pooh-poohed the seriousness of air attack on ships. A special committee was appointed to examine such evidence as existed. If the discussions and findings of the committee were published I think that you would find that the conclusions of the scientists were nearest to the truth; very naturally, perhaps, as they had no vested interests to defend. We must always be careful not to come to positive conclusions about the effect of any new invention on war until we have had the time and opportunity to consider the matter in all its bearings.

To return to the XIXth Century: broadly speaking, private enterprise was responsible for the technical progress of the fighting Services, and organized research was on a small scale. I have already mentioned research on explosives; in addition the science of ballistics was intensively studied. The Army in particular recognized the importance of a scientific education. No less a person than Michael Faraday taught at the Royal Military Academy from 1829 to 1853; he was succeeded by Abel, who was called the "Scientific Adviser to the War Office," which has a modern ring about it. But on the whole the help of scientists was sought sporadically and not continuously; and in the latter half of the Century, when peace and prosperity descended on the land, the temporary enthusiasm for science, which had been roused by the difficulties as much as by the discoveries of the first half, waned; and the Services, like British industry, became lethargic and self-satisfied.

The lethargy was broken by the startling discoveries and inventions of the last few years of the Century. Of these, the two that had the most immediate and far-reaching influence on war were the inventions of the steam turbine and of wireless; and it is most interesting and instructive to contrast the reactions of naval officers to them. The steam turbine, a remarkable invention, based on a real understanding of thermodynamics, was nevertheless, to the unscientific mind, only another way of using steam for the production of power. From that point of view there was nothing fundamentally new about it; so, in accordance with the natural tendency of practical men who knew the virtues of existing steam engines and had got used to their defects, the inventor of the turbine was regarded as an unpractical visionary. If Charles Parsons had not had ample private means behind him, the turbine would have been left to foreign countries to develop. As it was, his funds were nearly exhausted by the time the Turbinia triumphed over the sceptics before the eyes of the whole Fleet assembled at Spithead for the Diamond Jubilee review in 1897. But wireless was something quite new, mysterious and unimagined. With its aid it might be possible to do what had never been done before, namely to communicate from ship to ship outside the range of visibility. So the Navy took an immediate interest in it; and largely through the enthusiastic work of one who later became Admiral of the Fleet Sir Henry Jackson, F.R.S., twenty-six ships of His Majesty's Navy were equipped

with wireless two years after the first messages had been successfully exchanged across the Channel in 1899.

Much, I think, could be said in favour of the proposition that if it had not been for the South African war, when a handful of ill-equipped Boers succeeded in demonstrating our own glaring deficiencies in training, equipment and methods, we should not have had to fight the recent war because we should have lost that of 1914/18. A period of eager reform followed the South African war; nevertheless, there was but little development of organized scientific research to meet the needs of the Services until the Liberal Government came into power in 1906. Lord Haldane was the man who created, in this as in other ways, a new spirit of adventure. It was he, for example, who was personally responsible for the establishment of the Advisory Committee for Aeronautics in 1909. In his speech in the House of Commons in August, 1909, after referring to the fact that existing aeroplanes had little if any military value, Haldane said: "I made up my mind that there could be no real progress unless we proceed scientifically and in order . . . I felt myself able to advise my Right Hon. Friends that science should come first." He put Lord Rayleigh in charge of the Committee, as President, and at the same time greatly enlarged the scope of the work of the Royal Aircraft Factory at Farnborough. This was the first instance of the appointment of an independent scientific committee to study continuously matters of great importance to the Services. The indirect, no less than the direct results of its work have been very great.

In spite of this and other instances of a growing realization of the importance of a scientific approach to the problems of war, time was too short for a complete change of attitude in all branches of the Services before war broke out. There was no scientific man at that time in a position to guide and influence policy. Glazebrook, the first Director of the National Physical Laboratory, which had been founded in 1902, did what he could, but received no particular encouragement. Research in industry was on far too small a scale to make up for the absence of Government initiative; nor indeed is it possible to rely on private research unless the objectives are well thought out and defined. The result was that, though the standard equipment of the Services was considerably improved, little attention was given to new weapons and methods of war. Let me illustrate this from my personal experience. When I joined the Royal Garrison Artillery as a young man in 1914, I was impressed by the technical excellence of the 6-in. gun and by the precise scientific methods adopted for accurate shooting. But later on, as a 2nd Lieutenant, I was put in charge of an anti-aircraft gun for the defence of Portsmouth. It had open rifle sights and fired a 1-in. shell with a contact fuse. I doubt if it would have been possible to hit a Zeppelin with it, let alone an aircraft flying a few thousand feet high. Evidently no one had even begun to think seriously of anti-aircraft defence. Subsequently much good scientific work was done on the subject; but it was too late to have any real influence on the war of 1914-18, although it laid the foundation for the work that has been done since.

THE 1914-18 WAR

When I transferred to the Royal Flying Corps in 1915 and was engaged on experimental work at Upavon, I found the same absence of any sign of interest on the part of the War Office before that war in the scientific development of the new fighting arm. The Advisory Committee for Aeronautics had been engaged on research in connection with the design of aircraft, but its terms of reference did not include the duty of examining the use of aircraft in war. No one, for instance, had con-

sidered the problems of bombing; not even the most rudimentary bomb-sight was available until a young Oxford chemist, R. B. Bourdillon, produced the first. No one had thought out methods of navigation; pilots were discouraged from relying on instruments, and it was left to a young Cambridge physiologist, Lucas, to design the first satisfactory air compass. As for air fighting, the enemy called the tune and we danced to it. Our technical deficiencies were most depressing to all young scientists in the Royal Flying Corps, until Bertram Hopkinson, who was Professor of Engineering at Cambridge, was put in charge of all experimental work. He brought vigour and imagination into the work. It was he who founded Orfordness Experimental Station for the investigation of gunnery, bombing and navigation, and Martlesham Heath for the testing of aeroplanes. He was the first, so far as I know, to insist on the study of air tactics by scientific methods. He had not only the position, but the qualities, to command respect from soldiers and scientists alike; and those of us who served under him, and who have been able to do anything for the Services in later years, have owed our capacity to do so largely to his leadership and inspiration. His death by accident in 1918 was a real national calamity.

In other branches of the Services the same lack of foresight was apparent. It never seems to have occurred to anyone in the Admiralty before 1914 that it might be possible to locate a submerged submarine by scientific methods; and nothing, so far as I know, was done until the submarine menace was acute. Then a great effort was made; but it was too late to be decisive, and the submarine campaign was in the end defeated by the convoy system which was forced on the Admiralty from outside. Perhaps we can regard this now as an outstanding example of "operational research" by amateurs. As for the Army, is it not true to say that with few exceptions we copied, and sometimes improved upon, the new methods and weapons of the enemy? The outstanding exception was the tank, which would not have been produced if it had been left to the decision of the High Command.

The main lessons of the war of 1914-18 were taken to heart. There came about a great development of scientific research under Government in industry and in the Universities. The Admiralty, convinced of its value, established in permanent form its Department of Scientific Research, which had been improvised during the war, and put a scientist in charge. The Air Ministry, oddly enough, was at first content to leave the direction of scientific research to an Army officer, and it was not until 1924 that it appointed a Scientific Director of Research under pressure from outside. The Army developed its experimental establishments, but left them under the direction of Army officers. No scientist was responsible to the Army Council for general scientific policy until 1938. One great lesson was in fact lost. It was this: that it is not enough to look to science to supply the wants of the Services; scientists must also study the needs. The result was that in the inter-war period, in the scientific laboratories of the fighting Services as in other departments, although much good work was done, too much time and effort were spent in fighting the last war over again. I remember well how on one occasion, in 1937, I visited a Service establishment to arrange for certain experiments. I spent ten minutes or so in explaining the object of the experiments. The scientist in charge said: "I've been here for twenty years, and this is the first time anyone has told me the real object of any work that I have been asked to do."

The first time, I believe, that scientists were ever called in to study the needs of the Services as distinct from their wants, was in 1935, and then only as a last resort. The Air Staff were convinced of the inadequacy of existing methods and equipment to defeat air attack on Great Britain, and a committee was established

for the scientific survey of air defence. I want to emphasize that this committee, although it consisted on paper only of scientists, was in fact from the first a committee of scientists and serving officers, working together. It was quickly realized that one could not rely on the sound locator, to the improvement of which so much effort had been devoted, for sufficiently early warning of the approach of enemy aircraft. When Watson-Watt came forward with his proposals for radio-location, he found receptive listeners, and the Committee was in a position not only to arrange for the first successful trial, but to influence the rapid development of the new method on a large scale.

RADAR AND THE 1939-45 WAR

Radar, as it is now called, had a decisive effect on the War. Much has already been published about it, and it is not necessary for me to describe its scientific development in detail. What is necessary is to emphasize that our own success in the use of radar was not merely due to the fact that we had young scientists of the necessary calibre to undertake the experimental work; in military language it was not only that our tactical strength in science was great. For after all, radar was not an end in itself; it was a means to an end; and the end was interception of the enemy, whether by aircraft or ship, shell or bomb. Long before radar was a proved practical success in any form, experiments on new methods of interception of aircraft by aircraft, based on its use, were in progress at Biggin Hill under the direction of the Committee. The new methods were adopted by Fighter Command in 1937, and were continuously improved throughout the War.

When I went to Washington in 1940 I found that radar had been independently invented in America about the same time as it had been invented in England. We were, however, a very long way ahead in its practical applications to war. The reason for this was that scientists and serving officers had combined before the War to study its tactical uses. This is the great lesson of the last war. Long before its end, the example set by the Committee for the Scientific Survey of Air Defence had spread throughout the Services; and on the staffs of all the chief commands scientists were studying the plans of future and the results of past operations. Success in battle turned on this kind of co-operation, without which neither the Battle of Britain nor the Battle of the Atlantic would have been won. Many mistakes were made, of course; and all who were concerned with the evolution of the scientific organization in the War are conscious of its defects. But taken as a whole it was far better than that of the enemy; and the myth of German superiority in science has, I hope, been finally exploded. Where Germany scored, in the earlier part of the Century, was not in the possession of a greater innate genius for science, but in the realization by its leaders in peace and war of the vital national importance of scientific research and education. Germany's failure in this war was partly due to the persecution and banishment of some of its best scientists before the War, but mainly to the complete misuse of the scientists that remained. The High Command was too confident that it knew what was needed in all branches of the war effort, and turned to the scientists too late.

THE FUTURE

So much for the past. Let us now consider what the future has in store. In drawing conclusions we must be guided but not hypnotized by past experience. Hitherto the advance of science has made war more dreadful to the imagination, but far less cruel and devastating in reality. The greater powers of destruction have been more than balanced by better methods of protection and defence, by quicker processes

of recovery, and by the prolongation of health and life due to the prevention and cure of disease, the progress of surgery and the advances in the sciences of nutrition and agriculture. Will this continue; or must we anticipate that future advances in science will put civilization at the mercy of any aggressive nation that is allowed to mature its plans in secret?

The Atomic Bomb

It is the spectacular success of the atomic bomb that is forcing us to face these questions. The secrets of the atomic bomb are still closely guarded in America, though apparently not quite so closely as our Allies may desire. But these secrets are those of the actual details of manufacture and use; the fundamental scientific information is available to all, and it has been estimated that any nation that can command the services of skilled scientists and engineers can produce atomic bombs within five years, even if they start from scratch without the benefit of any secret information. All that I shall say about it is based solely on published data.

What is now well known is that certain forms of unstable elements can be prepared at great, though not prohibitive cost from uranium minerals. They are unstable in exactly the same sense as explosives are unstable. The material can be stored quite safely; it does not explode of its own accord without any external stimulus. But if the right stimulus is applied under the right conditions, as a spark is applied to an ordinary explosive, there is instantaneous decomposition throughout the mass, and the available atomic energy is released in the form of heat, light and other radiations. This energy is very large compared with the energy available in the ordinary explosive. The energy available in one pound of one form of uranium is about equivalent to that in 10,000 tons of T.N.T. This does not mean that a bomb weighing one pound will produce as much damage as 10,000 tons of T.N.T., for the bomb itself is a complicated and weighty affair; but it does mean that a single aircraft could carry a bomb that will produce as much devastation and death to a large town as hundreds of aircraft carrying bombs of the ordinary type—that is, provided it hits the target. There are other ways in which this lethal blow can be delivered, for instance by longe range rockets of the type that the Germans used too late, provided that their flight can be controlled with sufficient accuracy; and we cannot rule this out as a possibility if scientists and engineers are going to set their minds to it.

The American and British scientists who have been concerned with its development have publicly stated their emphatic view that there is no answer to the atomic bomb. Perhaps we should be careful how we interpret this statement. It has been said of other things before. There is no answer to a bullet if one is in the way of it and unprotected; but how many bullets does it take on the average to kill a man in war? When one is only at the very beginning of a development which may in the end revolutionize industry as well as war, it is, I feel, a little rash for scientists to say that no counter measures can ever be devised. But even if they cannot, it remains true to say that a decisive effect in war will depend on the number of bombs available and the proportion of them that hit a worth-while military objective. There is no information available which enables the ordinary man to form any judgment about this. He had better be careful therefore not to rush to conclusions, for he has not the data to consider the matter in all its bearings.

There is, however, one thing that can and should be said. Experience has shown that a nation with toughness, stamina and a will to live and work, can stand far more punishment in the form of bombardment of its cities and homes than most people

thought possible before the trial. No one thinks now that it would have been possible to defeat Germany by bombing alone. The actual effort in man-power and resources that was expended in bombing Germany was greater than the value in man-power of the damage caused, and the military success of our bombing would have been even less if the Germans had devoted to the strengthening of their defences some more of their scientific resources which they either wasted altogether or diverted to less important tasks. Hence it must be accepted that to produce a decisive effect on civilian morale and production in any future war, with bombs of the type used in the last, would require an enormous industrial effort, and that so many bombs and carriers would be needed that they could not possibly be made ready and stored in peacetime. The trouble about the atomic bomb is not so much that it is so much more effective, weight for weight, as that it is so much cheaper when everything is taken into account; and that it is conceivable that a nation so inclined, with access to the raw material, could steadily manufacture and store bombs and their carriers in peacetime and so be ready to discharge them at short notice with devastating effect. The war of the distant future may then be one of short months or days of agony, instead of long years of stress and toil.

How does this prospect, which we must not exclude from consideration, affect the size and nature and the training of our peacetime forces? If a future war is going to be so sharp and short, will it be necessary to have a Navy and Air Force to guard our sea communications, and will the blockade of our enemies have any significant effect? Is the battleship doomed at last for ever, and is a large bombing force obsolete? These are the kind of questions that people are asking. The answers are (1) that the " if " is a very big " if," and that you and I are not capable, and if it comes to that no one else, in my opinion, is yet capable, of forming a good judgment on the known facts; (2) that it depends on whether peacetime forces are designed to maintain international law and order in co-operation with other nations, or whether they are mainly intended to form a nucleus of the forces which may be expanded as rapidly as possible for defensive and offensive purposes in a future war between so-called civilized nations. If their main functions are those of an international police force, there is no strong reason why equipment, training and methods should be radically changed in the near future, though they may be greatly improved in detail. The policeman's truncheon has not yet been replaced by a tommy-gun in this country; but we still find it necessary to have police and to equip them with new, though not lethal, scientific devices. Whatever happens, we must see that when the smoke of battle has cleared away and peace really returns, we have scientifically educated men in our fighting Services. The size of the forces will be relatively unimportant. This war, said General MacArthur to me on one occasion, is a war of science and speed. Energy is proportional to mv^2; give me more v and I'll do with less m. This will be even more true in the future: a future war between highly organized nations may well be a quick fight to the death, and its outcome may depend far more on the state of science, education and industry in the rival countries than on the courage, skill and number of the fighting men.

Why, it has been asked, if the possible danger to civilization from atomic bombs is so great, do not nations agree not to manufacture them? The answer that has been given is that the controlled use of atomic energy is of such great potential value in industry that intensive research and development must proceed, in the course of which considerable amounts of fissionable material will be manufactured and collected which could in a short space of time be made into atomic bombs. Now all scientists are agreed that one great advantage of the new method of releasing atomic

energy under control is that it enables radio-active forms of many different kinds of elements to be made, and that the use of these in experimental work is certain to advance scientific knowledge, particularly in the biological sciences. But only minute quantities of such materials are needed for scientific purposes, and it is not at all necessary to make large masses of the explosive elements. It is only necessary to make large quantities if the material is to be used for producing heat, e.g. for replacing coal as a source of industrial heat and power. I have not seen any evidence that the use of atomic energy on that scale is likely to be of any economic importance in the near future. It may well become so, as the result of further research; but the research that is necessary can be done on a scale which does not involve any international suspicion and unrest. I may be quite wrong, in my ignorance of the facts; but if I am wrong I see no reason, in the interests of national safety, why the matter should not be openly discussed. It is not necessary, in the discussion, to disclose secrets of the bomb. If I am right it follows that it might be possible to reach an international agreement limiting the quantity of fissionable material manufactured to the relatively small amount necessary for research purposes. This at any rate would lighten some of the heavy cloud of suspicion that hangs over us.

Whether such an agreement would be practicable is another thing. It may be that it would not even be wise, for it might lead to a false sense of security. As Professor Urey recently said in America, we must not forget that the fundamental problem we have to face is not the atomic bomb but war itself. It was indeed fortunate that the atomic bomb and the long range rocket were publicly demonstrated before the end of the War, although they had very little effect on its outcome. They opened wide the eyes of the people of the World who otherwise might have gone happily to sleep again while such weapons were developed in secret. But are you and I to assume that they are the only new weapons of destruction that science can devise, if science is to continue to be prostituted by all nations for warlike purposes? We would be very unwise to think so. Depend upon it, we are still only at the very beginning of the scientific age with all it holds in prospect for the health, happiness and education of ordinary people, and with all the dangers it entails if its control gets into the wrong hands. In one of his last sermons in Westminster Abbey, long before the first atomic bomb was exploded, Canon Hensley Henson said: "Modern science may place in the tyrant's hand the subtle and almost omnipotent mechanisms which multiply physical force and seem even to menace the integrity of the human spirit; but it does not provide the motives or dictate the objects which determine his use of them. And always science is grandly impartial, aiding and arming the oppressed as well as the oppressor. It leaves man where it finds him, sinking down to the primeval brute or rising grandly to God from whom he truly comes."

A Scientific Staff

This brings me to my last point. Have we really learnt at last how to use the resources of science in the best way to ensure the security and prosperity of the British Commonwealth of Nations? Have we found the right place for scientists in the Councils and Departments of the State; or shall we have to wait for yet another war to teach the final lesson, when it may be too late? It took the bitter experience of one world war to demonstrate to the practical men of the Services, against their preconceived opinions, that many of their wants could only be supplied with the help of scientists, and to politicians that the security of the country in war depended on the spread of scientific education and research throughout the country. In the course of this war some scientists began to acquire and to study the tactical experience

on which the wants of the Services were based ; that is to say, they began to study the needs as opposed to the wants. But they rightly went back to their normal work, and those that were left or were recruited to the research departments of the Services soon succumbed, with few exceptions, by force of circumstances, to the doctrine that theirs was not to reason why. It took another world war to demonstrate finally and without any question or doubt that the real tactical needs of the Services in war can only be well defined with the help of scientists ; that professional scientists, like professional sailors, soldiers and airmen, have their own special virtues as well as their own special faults ; that if they co-operate wholeheartedly at all levels the virtues are additive, while the faults tend to cancel out ; and that if the needs are properly defined, there is skill and genius enough in the country to meet them. In the course of the late war some scientists began, with great effect, to study strategy ; that is to say, they began to investigate what was most important to do, as well as how best to do it. Here too it was found that they had their own special contribution to make. What disturbs me is the thought that this lesson, only partially learnt, will be lost ; that no competent scientists will be left to pursue it ; and that the Services and the Government will be content with the thought that they can always rely on the unpaid services on committees, when they think it necessary, of scientific men who are striving to earn a modest living at the same time that they are advancing knowledge. The retention of scientific advisers on the staffs of all three Service Departments is a step in the right direction, but it is not enough in itself. What is needed is a scientific staff attached to the central Chiefs of Staff organization that will have no executive duties, nor be overburdened by administration, but will devote its whole time to the study of the influence of advancing scientific knowledge on the problems of defence. This is a branch of strategical study that needs just as much attention and forethought as any other branch of military strategy ; indeed, it requires more. If we neglect it I see no chance whatsoever that our great country will survive another world war.

DISCUSSION

Sir Robert Watson-Watt : Being still a Civil Servant and therefore subject to some of the limitations of completely free expression of opinion which are quite properly imposed on Civil Servants, I can only say that there is no single word that Sir Henry has spoken with which I disagree. I believe that his closing sentences are a warning which is not being adequately heeded at this moment, and there is quite a substantial danger that the application of these principles may be delayed for a longer period than we can afford. I think that is not because of any inherent wickedness either in the administration or in the high military officers ; it is due to the fallibility of human nature, which is most energetic when it is most frightened.

Sir Henry was fortunate in finding a favourable milieu for his propaganda for science in the Services at a time when, to use language not wholly appropriate to this place, we were scared stiff. We shall probably not act again adequately until we are scared a good deal more than we are at this moment. I believe that this is the very room from which there should go a warning to our Administration that the principles which are accepted in general terms, and with complete good faith and good intention by Ministers and by the leaders of science must not be allowed to be forgotten. Unless the Members of this Institution do make a specific effort to convince those responsible for the utilization of science in this country that there is a need for something that is not yet happening, then I believe that Sir Henry's fears will be realized. For the moment I am bound to say that I am something of a pessimist in this matter of the fulfilment of Sir Henry's advice.

Rear-Admiral G. E. Creasy : I gathered from Sir Henry's closing remarks—I may have misunderstood him—that he almost advocated some form of international prohibition

or limitation on the atomic weapon. I would like to suggest that our experience between the two wars points very clearly to the extreme danger of reliance on any such form of international action.

Looking back on 1918 and 1939, most of us will remember, as an example, the efforts made to outlaw the submarine. Had these efforts proved successful, you may be very sure that Germany would have done as she did do, planned right from the word " go " to fight a full scale submarine war when war came, and we should have been caught with no preparations or training for countering such a move. I feel that if we put our trust in international good faith over atomic energy, we should be going up exactly the same dangerous path.

AIR VICE-MARSHAL P. H. MACKWORTH: I had a little contact with Sir Henry and his committee on the subject of navigation just before the War.

I think one of the most important things brought out by his lecture is the need for continuing close co-operation of the Services and the scientists. Sir Henry's expression, that the Services think they know what they want but the scientist knows what they need, is very true. In this matter of navigation the scientists offered us something—radar—which the Service personnel did not even imagine possible. This leads to an important point in co-operation between the two; if the Service controls the scientific advisers too closely the results will tend to be parochial, but if the scientists are given a free hand in co-operation big advances may be expected.

We have scientific advisers working in our various establishments with Service personnel: that is good and they will stay, but outside scientists are vitally necessary as well. They must be given a very free hand and full facilities to talk and consult with anyone. Further, they should be answerable only to the highest levels, probably the Chiefs of Staff Committee.

CAPTAIN E. ALTHAM, R.N.: I think we are all fully alive to the great importance of the three Services trying to keep together and of the part this Institution should play in that, but Sir Henry has made us realize that it is no less important for the fourth partner in the firm to be included in the party, which should be a family party.

He has reminded us of the American authority who said: " It is not the atomic bomb that we have got to fear in the future; it is the fact of the recurrence of war." I do suggest that, whatever science can produce for us as a fearsome weapon of the next war, it is to the Services, and the Services very much as they exist to-day—perhaps re-armed, perhaps brought continually up-to-date with the help of science—that we must look for the preservation of order in the World. We cannot keep order with atomic bombs. We may, by the threat of atomic bombs, frighten the nations into remaining at peace, but we still require the Services to prevent disorder developing into World war.

THE CHAIRMAN

About a month ago, I was stormbound at Alexandria. Glancing out of the window, I conjured up the gorgeous palace of the Ptolemies, which has long since vanished. To landward of it I saw, in my mind's eye, as near the Government Palace and its extensive offices as St. James's Park is to Whitehall, the courtyards and colonnades of a great university, which had been founded as an institution for research, more than for teaching, though in practice the two went hand in hand.

I then realized that I was on holy ground for science, for in the famous Mouseion of Alexandria, in the Third Century B.C., modern science has its roots. It was there that Euclid composed his Elements and founded a mathematical school that lasted seven hundred years. One of his pupils inaugurated the study of conic sections. It was there that the size of the Earth was first measured, the result for the diameter coming within

50 miles of the correct figure, which was not so bad. The calendar which we now use was also worked out in that Century. In that university the science of physical geography originated, and there were notable contributions to Astronomy. Here again, Herophilos was the great teacher of anatomy and the father of surgery.

In the realms of applied science, straight in front of my window stood the famous Pharos, the parent of all lighthouses and signal stations, four hundred feet high, which was the outward expression of the mathematical studies carried on in the Mouseion. A fortress as well as a beacon, the Pharos was the pivot of the city's naval defences. Westward it could signal another station across the western harbour, and the system was prolonged eastward by a long line of coastal watch towers and beacons as far as the daughter kingdom of Cyrene.

Applied science also is illustrated by the exploring and development of the Red Sea and by the reopening of the ancient canals providing communication from the Red Sea with the Nile and so with the Mediterranean.

Among other things these canals were used to bring elephants—the tanks of that day—from Red Sea ports in specially constructed elephant ships, called Elephantegoi, to all parts of Egypt; but the African elephant could never stand up to the Indian elephant because it hated its smell and its trumpeting, and eventually anti-elephant devices reduced their importance as shock forces.

Beyond perhaps providing a chapter for Sir Henry Tizard's book, you will be asking what has all this to do with our lecture? More than perhaps appears. For all its success, this close association of culture and research, working in close touch with the government, had its limitations and did not get nearly as far as it should. The historian tells us that "the Palace"—which was only another name for the government—"provided the finance and called the tune . . .", dominating the scientists "who knew that if they failed to give satisfaction they would be expelled from the enchanted area . . . It sprang up behind walls, it never knew loneliness, nor the glories and the dangers of independence." Here, no doubt, was Treasury control both of its expenditure and of its purpose: control of scientific research by people who may often have been unsympathetic and incredulous, insistent on immediate results, sceptical of pure research. They were working for what the government wanted, not what the government needed. The marvel is that it flourished as long as it did.

This is another warning that, in these days when everything is being nationalized, research must be allowed to develop in freedom, in universities and in private laboratories and, as far as may be, in government establishments, unhampered by the red tape and restrictions and endless forms of government control everywhere.

How, then, without trammelling research, are the advantages of science and engineering, which Sir Henry Tizard has shown to be vital to our future system of defence, to make their proper contribution to our defensive system? How are the lessons of the War to be applied to the future? How are we to avoid falling back into apathy, ignorance, inertia and mistrust of gadgets? I believe that it can best be accomplished on the broad lines which I ventured to suggest in my Lees-Knowles Lectures at Cambridge just a year ago which have since been published in a short book entitled *Government Control in War*; in other words, I believe you must not only keep science in the Government departments and in the Services, but we must bring science into the heart of our Central Defence system, that is to say, into the Committee of Imperial Defence and into the Chiefs of Staff Committee itself. It was the Committee of Imperial Defence, adapted to the tempo of war, which steered us through the two greatest wars of our history, but they will not do it again unless they have a very much stronger scientific element than they have had hitherto or than is the case at present. I suggest that into the very centre of our whole system we must establish a strong, permanent scientific section, at the head of which there should be a first-class scientist who can speak to the higher people on the Committee on terms of equality and to whom Chiefs of Staff will instinctively look for help as an equal.

I might mention that I heard yesterday—I think it is correct, although I tried to check it up but was unable to—that a gentleman called Ormond Solandt has recently been appointed as Director of Scientific Work for the Canadian Services, for the Canadian Ministry of Defence, or whatever the right organization is, and that he has been graded on a level with the Chiefs of Staff. That is what I want to see here, a permanent scientific section, which must be sufficiently broadly founded to know a great deal about science and where information is to be got. They must be in touch, on the one hand, with all the activities of the Committee of Imperial Defence, and on the other hand with the march of science in all its branches—and I do not believe we should leave anything out: physics, chemistry, civil, mechanical and electrical engineering, metallurgy, biology, nutrition, medicine, agriculture, and the separate researches conducted by Government departments for their own needs, which must, of course, continue. If that section can be established, they will find much to help them in the lecture—the very thought-provoking, very wonderful and, if I may say so, most sparkling lecture to which we have been listening this afternoon with so much pleasure and enlightenment. They would also find help in a very impressive lecture by Professor Bernals on the Lessons of the War for Science, where he says that scientists benefitted almost as much from their war experiences as the Services and the war effort did from the scientists. They were given greater means and scope and greater help than they have ever had before. Where a man could spend £10 before, he could spend £10,000 in the war.

Under schemes for which I was responsible, scientists, some of higher and some of lower degree, double in number to Wellington's British Army at Waterloo—there were over 60,000 of them—were trained in all the Universities and at one time in over ninety technical colleges for radio and radio-location, not only for the fighting Services, but also for industry and research. All that has got to be kept going. The Scientific Register has got to be kept up. Unless you have got at the centre a body to keep an eye on it, I am terribly afraid that all that working contact with science which has been so powerful an aid will disappear before long. I believe that the scientific section may prove a dominating influence. I would have more than that. I would have also a strong directing committee—not very large in itself but with a panel of scientists covering the whole of the ground, who could be called in. They should form an advisory committee. They should be kept informed by periodical reports. They would, of course, be persons acquainted with the uses of science in the late war to start with, and would establish a tradition. They should have access to the scientific section and to all the information they require, and they should, above all, have the right of initiating subjects for further research. I think that, once ensconced in the Committee of Imperial Defence, science will get its contacts with Ministers, the fighting Services, the Civil Service, and many of the leaders of public life outside politics, and in that way science will permeate the whole body of political and administrative life with an influence extending far beyond that of science in war. I believe some such system to be essential, for I agree with everything that Sir Henry Tizard has said about the kind of influences that obstruct progress: over-work and ignorance of what is going on.

There remains nothing else for me to do except to thank Sir Henry very warmly on behalf of the whole meeting for the wonderful speech he has given us to-day. (*Applause.*)

Admiral Sir Charles Little: I know you would not like to go away from the meeting this afternoon without thanking Lord Hankey for presiding here and for his summing-up and the information and views which he gave us. It is so appropriate and fortunate that for this important lecture we have had Lord Hankey here, because no man has done more than he, with his high position in the machine of Government, to promote the development of science in the Services.

A vote of thanks to the Chairman was carried with acclamation.

BEHIND THE ENEMY'S LINES IN BURMA

By Brigadier B. E. Fergusson, D.S.O.

On Wednesday, 20th March, 1946

General Sir Walter M. St. G. Kirke, G.C.B., C.M.G., D.S.O.,

in the Chair

The Chairman: I am particularly glad to take the Chair for Brigadier Fergusson to-day, because I had the privilege of serving in his father's Corps in the war of 1914–18. The son has shown himself to be a worthy "chip of the old block." To those of you who have read his fascinating book, *Beyond the Chindwin*, he really needs no introduction from me, and so I will ask him to start straight away.

LECTURE

IT is two years this week since General Wingate's aircraft crashed into a hill near Bishenpur and he was killed, since the day when, as Lord Wavell has said, "after a meteoric career he fell as the meteor falls—sudden, swift, unaccountable." The news was kept secret for nearly a week, even from his brigade commanders in the field. At the end of that time it was published; and it was a grievous shock to all those engaged in fighting the Japanese. Officers who had been taken prisoner on his first expedition and who were lying in Rangoon gaol have told me since how the Japanese burst into the prison frantic with delight at the news. These officers had been subjected many times to interrogation by the Japanese as to what Wingate's intentions might be. The Japanese, at least, reckoned him a great commander.

With the passage of time it should be possible by now to begin to assess his true importance. He is in danger of being thought of more as an eccentric and glamourized guerrilla leader than as a serious military figure. I was myself solemnly warned against engaging under his banner on the grounds that one's orthodoxy would be for ever suspect. A good deal of venom can be injected into that overworked phrase, "a private army." Through misuse it has lost most of the pungency which it once possessed; and in any case, if Wingate's was a private army, I am proud to have been in one.

I claim, at all events, that General Wingate's conception of the theory of long range penetration, his contribution to the successful outcome of the campaigns in Burma and his permanent contribution to military thought, should be examined without prejudice, whether that prejudice is a legacy of the many clashes into which his strong personality led him or to the lack of perspective with which he was presented by the more sensational newspapers.

It must be realized first that his two Burma expeditions were entirely different from each other in purpose. One thing, however, which is often forgotten was common to both. His expeditions were designed, both in 1943 and 1944, as offensive rather than defensive. His object was to help forward the great advance across the River Chindwin which was the ultimate aim of our plans, although it was never finally mounted until the beginning of 1945. This cardinal fact, that both his expeditions were offensive in design, is often forgotten, and those who condemn the 1944 expedition on the grounds that it "failed to affect the main battle" forget or ignore the fact that the main battle in that year proved to be, not the offensive which had been planned, but the defensive which was forced upon us by the enemy.

I have a vivid recollection of accompanying the then General Wavell, as a member of his planning staff, to a conference with the commander of the Eastern Army in September, 1942. General Wavell was determined at that time to mount an offensive across the Chindwin in the early months of 1943 if he possibly could; and he was further determined not to be shaken in that resolve until every effort had been made to overcome the obstacles in his way. Chief of these was the lamentably low capacity of the Manipur road. At that time the potentialities of supply by air had never been proved and surface supply was the only method. It was still hoped, however, that forward dumping to Imphal might make the offensive possible in March of the following year.

A month later I left General Headquarters to join General Wingate as a column commander. The training in the jungles of the Central Provinces was hard beyond any training I have seen; but those months were equally the most exhilarating that I have spent. The standard of soldier, both British and Gurkha, was low; the British were all found from a battalion with a high average age which had been sent to India for garrison duty; the average age of the Gurkha was at the other end of the scale, and they looked to be about 15 years old. The scarcity of troops in India was acute and no others could be made available. There was little experience in the force.

Wingate's First Expedition

We concentrated at Imphal at the end of January, 1943, having marched up 120 miles of road from railhead. The force consisted of about 3,000 all ranks, organized in three British and four Gurkha columns. Each column was some 350 strong; it comprised an Infantry company, a Support platoon with two Vickers machine-guns and two 3-in. mortars, a Sapper platoon for demolition work and a Reconnaissance platoon of 50 men of the Burma Rifles. I never ask to command better troops than these last. They were Regular soldiers who had chosen to come out of Burma, and they marched in and out of Burma with us, both in 1943 and 1944. There was nothing to stop them putting on plain clothes and going home, but they didn't do it. Some of them actually marched through their own native hills and still stuck to us and continued to share our hardships and dangers. Our debt to these men is beyond calculation. They acted as our scouts; they were our eyes and ears; without them we should have been blind, deaf and dumb. Their officers were young British employees of the great firms of Burma, magnificent men in the best tradition of our nation. It is to be hoped that whatever the new set-up in Burma may be, the claims on our gratitude of the men whom they led, Karens, Kachins and Chins, will not be forgotten.

Early in February, 1943, General Wavell came to Imphal and broke it to General Wingate that the offensive was off, and with the offensive our expedition. But General Wingate pleaded that we were all keyed up to go, that the experience which we should gain would be invaluable in later campaigns, and that the good which would come from letting us go in unsupported would offset our certain losses. All his officers were behind him in this. Although of our strength one-third was lost and most of the rest came back so broken physically as to be unfit for further service for a year or more, I maintain that the expedition was well worth while.

Going in unsupported as we did, the Japanese were free to concentrate against us. Our original object had been to harry the enemy's lines of communication

at the moment when his front was being assaulted in the hope that he would be strangled by the pressure on his L. of C. and that he would have to divert a proportion of his troops to free it. Now that the offensive was off our role had to be changed, and our object became the gaining of experience, topographical knowledge, general sabotage and, if I may use a technical expression, dirty work. Most of all, General Wingate wanted to demonstrate that it was possible to rely on air supply as a sole means of supply, and on the radio as a sole means of direction. Hitherto, the Allies had only tried air supply as a last resort when troops had been surrounded, as in New Guinea and at Bir Hakeim.

The tangible results of the first expedition were admittedly meagre. We blew up portions of the railway from Mandalay to Myitkyina (and in passing may I say that that is a delightful pastime); we killed a few hundred Japs; and we think we put them off the projected occupation of the extreme North of Burma which was still in British hands.

General Wingate has been criticized for crossing the Irrawaddy. If he had not done so our chance of getting the whole brigade back to India intact would certainly have been greater. On the other hand, as he would declare most vigorously if he were here himself, without that crossing the experience would have been incomplete and there would have been broad gaps in our topographical knowledge. As it was, the bulk of his force was caught and bottled up in the dry and dusty jungle where the Shweli River forms a great loop before flowing into the Irrawaddy. We lingered there too long. The Japanese surrounded us, using the rivers to hem us in; and in order to break out we had to disperse into small bodies.

This dispersal put a great strain on everybody's morale and was the final blow to air supply, since there were insufficient wireless sets for all parties, and there was much suffering from lack of food on the way back to India. On the other hand, the individual parties made their way to safety by numerous different routes; some went West, some North, and one party marched 500 miles into China. Our combined knowledge of Upper Burma was now considerable.

It would be wrong to claim much for the first expedition; but the one really invaluable dividend was the proof of the efficacy of supply dropping. The whole force had been supplied by only five aircraft; and No. 31 Squadron, R.A.F., were the heroes of that astonishing feat. I still have a soft spot in my heart for the unknown aircraftman who, at the end of every supply drop, used to chuck that morning's paper out of the aircraft on its last run. From that humble beginning grew the immense airborne supply system which, more than any other single factor, brought about victory in Burma, and the credit of organizing it must go to the pioneering efforts of Major H. J. Lord, of the Border Regiment.

There was one other germ in that first expedition with a big future before it. We sent back to India information about profitable targets for our air forces. This grew in 1944 into what probably remains the most closely integrated air support ever achieved. I will come back to that point a little later on.

Major Calvert, commanding No. 3 Column, reached the Chindwin on his way out on 20th April, 1943; I got back to it on the 24th. (The memory is vivid to me because we had been without knowledge of the outside world for many weeks and I was greeted with the splendid news that German resistance in Tunisia was almost at an end. I had no notion that our forces were within 500 miles of Tunisia.) There

followed an anxious period without news of General Wingate. We believed that he had intended to make his way direct to the Chindwin; I had come a long way round and expected to be days behind him. However, about 30th April he turned up, characteristically swimming the Chindwin and arriving bedraggled on the West bank. His recovery from the ardours of the campaign was immediate. He spent the next three weeks typing, in a little hut at Imphal, a full report of the expedition, complete with elaborate plans for the future. The report was a magnificent piece of writing, but passages in it were unfortunately so scurrilous that it was bowdlerized before it saw the light. Three months later he was in Quebec. From there he returned with a licence from Mr. Churchill to raise a force of six brigades, and with a present from President Roosevelt of what the soldiers term a " private air force."

A " Private Air Force "

Now, it would be a very rash angel who dared to tread on the thorny ground conjured up by that expression, but in those circumstances and at that period of the Far Eastern war a private air force was a godsend to us. Like the expression, " a private army," it is too often assumed, axiomatically, that a " private air force " is a bad thing. Nobody will dispute the generally accepted view that the allotment of aircraft in " penny packets "—another horrible cliché, is normally uneconomical and wrong. In our peculiar form of warfare we could dispose of no artillery, and our air force was in fact our airborne artillery. The bombers and fighters trained with us so that we were on Christian-name terms and knew precisely each other's capabilities. They flew in support of us day in and day out, and they knew the country as well as we did; often they knew the precise situation of every column. This splendid band of aircrews considered, furthermore, that the proper place for experiment was in the field, and were eager to try out in actual operations any brainwave that they or we might have.

Their knowledge of us, our problems and our situation at any given moment was so intimate that we were able to dispense entirely with Air Liaison Officers. With each column there was a Royal Air Force officer and signal section. Air support would be summoned from India, two hundred miles away; and the pilots would be briefed in flight by the Royal Air Force officer on the ground. If when they arrived they were in any doubt as to their target, they would make a pass at what they guessed it to be; and the officer on the ground would correct it until they got it right. We enjoyed the rare privilege, with these methods, of getting fighter support within a hundred yards of our front, and bomber support (when we were defiladed by a gully) at about a hundred and twenty. I would like to speak much more on this subject, because I rank it as among the most significant of our experiences; but time will not allow.

The commander of this special air force—Colonel Philip Cochran, was the perfect foil to General Wingate. Together they dreamed dreams and awoke to find them realities. Colonel Cochran's air force, which was known as No. 1 Air Commando, comprised one squadron each of Mitchell bombers, Mustang fighters, and Dakota transports. He had also four squadrons of light aircraft which could, and did, land on 250 yards. The worst nightmare of 1943, worse even than the lack of food, had been the leaving behind of wounded or starving men. The fact that every man knew before he went in that this would be his fate if he were overwhelmed by wounds or sickness did not make it any easier, and the responsibility on the junior commander who had to make this decision was painfully severe. But with these light aircraft

and their gallant pilots, we lost in 1944 no more men, or very few more men, than would have been lost in a normal campaign.

We also used these light aircraft for checking, from tree-top height, information given us by locals of the situation of enemy supply dumps or other targets. Having done this, we would summon our Mitchells from India ; mark the targets by dropping smoke round them, also from the light aircraft, from a height of fifty feet ; and then watch the bombers lobbing their bombs into the middle of the circle of smoke.

Wingate's Second Expedition

The appointment of Admiral Mountbatten to South-East Asia Command came into force at the same time as Wingate returned from Quebec. Whereas the previous year our force had consisted of two low category battalions, in 1944 we were given the very best available. The whole of the 70th British Division was made over to General Wingate. This division was formed at the outbreak of war in the Middle East from all British battalions serving in that theatre. These men were veterans of the Palestine rebellion, of Crete, Somaliland, the Western Desert, Syria and Tobruk. The division had been sent to India in March, 1942, en route for Burma ; but the fall of Rangoon prevented it arriving in time for that campaign. In addition, excellent British and Gurkha battalions from India were made available, together with one Nigerian brigade which was intended for static defence inside Burma. Except for the Nigerians, the force was organized in five brigades of four battalions each, three of these brigades being wholly British and the other two mixed British and Gurkha. Altogether the force amounted to 17 British battalions, 3 Gurkha battalions, 3 Nigerian battalions and one battalion of Burma Rifles. There were no Indian battalions. I cannot deny that we were somewhat aggrieved when we found ourselves officially described as the 3rd Indian Division. This was originally devised as a cover name, but it gradually crept in as our official title, to the fury of the British troops. Good wine needs no bush, and the Indian soldier is his own best advertisement ; it was very hard that this predominantly British force should have been deprived of the opportunity of proclaiming itself as such. However, these things happen, and a friend of mine, lecturing in Musselburgh on the campaign, was asked by a member of the audience during question time, " What are the relations like between the British and the Chindits ? "

The second year's campaign was as different from the first as chalk from cheese. The plan this time was originally to seize the area of Indaw, an important communications centre in Upper Burma from which roads radiated to all points of the compass and railways ran East, North and South. At Indaw there were two airfields ; and it was hoped that if these could be seized or others built, it would be possible to fly in one or two divisions to exploit to the South. It was intended in addition to set up strong blocks on the main road and railway leading from Indaw to Myitkyina, and on the subsidiary road to Myitkyina from Bhamo. By this means it was hoped that the Japanese 18th Division opposing the advance of General Stilwell from Ledo in the North would be starved and forced to loosen its grip.

To accomplish this, two brigades were flown in to remote areas : one-and-a-half to the strip known as Broadway, the other half to Chowringhee. (The natural strip called Piccadilly, where a Dakota of 31 Squadron had landed the previous year without preparation to fly out seventeen sick and wounded, had been intended originally, but it was found to have been blocked by the Japs an hour or two before the take-off was due.) The 1st Battalion, The King's Regiment were in the

leading gliders. Their landing was marred by gliders hitting a number of fallen logs whose presence was obscured in the air photographs by high grass; but they got down, although with nearly a hundred casualties, and so did the bulldozers and other equipment for building a strip. That strip, Broadway, received a brigade and a half inside a week, and was held thereafter for two months. The Japs made one effort to overrun it, but were beaten off.

Meanwhile my own brigade, the 16th, was marching over from Ledo. We went so far up General Stilwell's road, and then pushed off into the mountains for what proved to be a hard march. It rained all day and every day, we had to cut every foot of the way, there was little level going, we had to build ramps and traverses for the mules, we crossed some completely new country, we were over six thousand feet for some of the way, and in the first nine days we averaged under four miles a day. We eventually reached the Chindwin, nearly a month after starting.

We reached the Indaw area, less one battalion which I had detached elsewhere, in time to assault it at the end of March. We had marched nearly four hundred miles in single file, which I think must constitute a record for single file marching; whether it does or not, I don't recommend anybody to emulate it. I was always particularly sorry for anybody who had to march all the way behind a mule—the same mule.

I tried, but failed, to carry Indaw by assault; and thereafter we dealt mostly in harassing the enemy's communications and his build-up against the block on the road and railway near Mawlu. We used as our base an admirable little valley running up into the hills some twenty miles away, on the Meza River. We built a Dakota strip there, twelve hundred yards long, into which another five battalions were flown.

It would take too long to describe the rest of the campaign in detail. In the middle of March the Japanese crossed the River Chindwin and attacked the IV Corps with what the newspapers used to call a "three-pronged thrust." That thrust developed dangerously, and troops were no longer available to fly in to the enclave at Indaw, nor to cross the Chindwin and move forward overland to link up with it. When General Wingate was killed at the end of March, he had two and a half brigades poised around Indaw and another one preparing to fly in; but the forces from outside which he had hoped would exploit the situation which his own forces were about to create were no longer available, nor did they become available until the Jap offensive had been broken and their army disintegrated.

Wingate's Death and Change of Plan

General Wingate's death would have been a catastrophe whenever it happened, but it could not have happened at a worse moment than it did. He was on his way out from a conference with myself and another of his brigade commanders; the orders which he had given us were unknown to his headquarters, and their ignorance of them was unknown to us. His successor was in the field, and could not be reached; the headquarters themselves were on the move from Imphal (which was nearly threatened by the Japs) to India, with results on our communications which may be imagined; and a further blow to our radio contact took the form of four days of violent thunderstorms. These days of confusion left a legacy behind them which made its mark and contributed largely to the breach of two principles of war which were all-important to us: those of concentration and maintenance of the objective; though in the latter case, breach of principle was inevitable with the change of plan.

At the time, and indeed until I discussed this lecture with General Slim, I and all the brigade commanders were under the impression that the change of plan happened at this stage when the Japanese were developing their movement across the Chindwin. But now I find that the plan was actually altered some weeks or months before, when the Japanese intentions first became apparent. For reasons of his own this decision was not communicated to us by General Wingate, perhaps in the hope that he might be able to win such success as would justify the High Command into reverting to the original plan.

The lesser object of helping General Stilwell on to his objective was eventually achieved. No supplies reached the Japanese 18th Division for something like four months, due to the activities of Brigadier Calvert's 77th Infantry Brigade in blocking the road and railway North of Indaw. That block (which was known as " White City " from the number of parachutes hanging on the trees about it) was held against intermittent but bitter assault for seven weeks, from 15th March until 9th May, and constitutes a splendid tale of ingenuity and stubborn offensive defence. The garrison, which at different times included British, Gurkhas, Nigerians, and Burma Riflemen, beat off several times their number of Japanese and shattered two Japanese formations, using every weapon under the sun, from modern air support, through 25-prs., mortars and flame-throwers to the humble rifle and bayonet and the still more humble metal grenade-box, which was used by a Nigerian soldier in preference to his rifle (which he grounded by numbers) to telescope the Jap officer whom he hit on the head with it. The story of White City is an epic, from the moment it was set up as the result of a spectacular charge up to the night when every gun was flown out by air ; and the garrison slipped out without the Japs knowing it had gone.

To that brigade also fell the honour of taking Mogaung, after bitter fighting in which The South Staffordshire Regiment particularly distinguished itself—it is interesting to note how this regiment took a prominent part both in these airborne operations and at Arnhem. As a result of the operations of these brigades (my own had been flown out to India in May) and the pressure of General Stilwell's forces from the North, the Japanese 18th Division practically ceased to exist, although I noticed that it cropped up in the enemy order of battle far to the South the following year. However that may be, it did not get away from its positions in the North, except for its commander, who is thought to have escaped down the Irrawaddy on a raft. With the fall of Mogaung the campaign ended, so far as Special Force was concerned ; and the brigades, very sick by this time as a result of having fought all through the monsoon, went out to India to eat gargantuan meals on a special and not ungenerous ration scale and to prepare for a third expedition which never materialized.

Lessons Learnt

So ended two seasons of extremely interesting campaigning behind the Japanese lines, with a wealth of lessons, military and moral, tactical and topographical, ornithological and odd. Speaking personally, I must own that I value most of all the experience of having lived and moved and had my being, thanks to a knowledge of what our primitive forefathers knew by instinct, but which we had to learn afresh —knowledge that our advancing civilization had discarded as superfluous, but which is necessary when one is living and hunting and being hunted in a vast land of forest. We had modern weapons, we had air and we had radio ; but we were fighting a savage enemy in primitive conditions. Very many of our preconceptions

of what that would mean were nonsense; and a good deal of nonsense is still being swallowed neat.

Too many people still subscribe to the doctrines of the "Green Jungle Hell" school. These are the people who used to say that there were two enemies, the Jungle and the Jap. Then they were told that they mustn't say that, so they told us that the Jungle was our Best Friend. The truth is, of course, that the Jungle, like any other type of country, can be pleasant and unpleasant; and like any other type of country it can be studied and learned by any intelligent man, and once learned can be fascinating. We taught our men to take a pride in their knowledge of jungle, and they became very good—the townsman every bit as good as the countryman.

As to the Jap, the Green Hell School used to describe him as "cunning." He is certainly not that; he is simple and gullible; but the fact remains that he is a very fine fighter and a very brave man, with the supreme endowment that he is prepared to die as an anonymous individual, out of sight of his friends and without anxiety as to his next of kin. That is a big advantage to him.

Of the many headings under which the lessons which we learned might be listed, that of "Intelligence" provides the best illustration to the point which I made a few minutes ago: that we had to learn afresh knowledge long since discarded. We have become accustomed in the Services—and perhaps in ordinary life as well—to having our intelligence collected for us, and to some extent sifted for us, and even to having the deductions made for us. Animals and primitive men have to devil for themselves in this respect, and so did we. For us, the brigades and columns actually in the field, the least valuable intelligence was that which reached us in a sealed envelope from our base. We wanted to know what the country was like all around us, where the water was, where the roads were, what the enemy was doing in our immediate neighbourhood. For topographical knowledge, our maps were not always reliable. I remember a river, for instance, that was shown as flowing downhill for some miles, when it suddenly turned up hill, and flowed up hill till it almost reached the top, when it disappeared into a spring. We developed an instinct for watersheds and for drainage systems, and a sense for the grain of the country, so that we could travel with the grain and not have to be for ever clambering into or out of glens and gullies. One had to learn the working of the bush telegraph and to realize how the community dwelling in each valley system is insulated in some degree from the community in the next; so that a valley system is also a gossip system, for gossip, like water, follows the grain of the country.

All our local intelligence came from natives and, contrary to popular belief, we found them very reliable, provided one had learned the rules. For instance, within a radius of eight miles or so, they would be accurate; from eight to twelve, sketchy; beyond that, vague or out of date and probably pessimistic. Again, for troops on the move they were highly accurate; for troops who were static, inaccurate; just as we ourselves might be vague about how many troops were in Aldershot if we went there to do our shopping, whereas if we saw them all march past a given point we would have a fair idea. Whereas we might not bother to count, the natives of Burma did.

Thus we always knew at the very least whether there were Japs about, and we might also be lucky enough to learn their approximate numbers. Actual recon-

naissance was slow, unless supplemented by local interrogation ; but topographical reconnaissance was greatly eased in 1944—the second year, by the use of light aircraft, and I flew many hours at tree-top height in these splendid little machines (American L.1s and L.5s) looking at the terrain which we were going to march over or attack. One thought no more of hopping into one of them for ten minutes than one thinks of driving for the same time in a jeep.

Tactics, Weapons and Equipment

On the tactical side, our practice differed little from normal infantry when we were operating as battalions or as columns. (I should make it clear that a battalion was organized in two columns, which could operate independently, but which normally joined up to fight a set battle). But we naturally lacked the normal supporting arms of the infantry—guns and armour. The place of the guns was taken by our American Mitchells and Mustangs, who responded to every call made on them. One of my battalions got air support from Mustangs in a crisis less than fifty minutes from call, from an airfield almost two hundred miles away.

The heaviest weapons within our own compass were the two 3-in. mortars and two Vickers machine-guns per column, together with Lifebuoys and Piats which we found very handy for knocking out lorries and which on occasion, when mortar bombs were short, were cocked up in the air and fired like mortars. Improvisation was the salt of our life ; and I think we rang the changes on most of our equipment, from carrying rice in our Mae Wests to filling our inflatable boats with water and using them as horse-troughs. And there again we learned a great deal in the way of improvisation from our Burma Riflemen. Whereas to our western eyes our equipment, limited as it was to what we could carry, was meagre in the extreme, to them it comprised an exceptionally generous and comprehensive outfit. With their groundsheets, with string made from the bark of shrubs, and a framework chopped with a few deft strokes of the long knife which both British and Karens carried, they could knock up a boat in a quarter of an hour. With the same knife they would skin a deer—a *sambhir* or a *saing*—in as short a time as it would take me to put on a collar and tie. It would be false to pretend that our troops got as good as they did, but at any rate they became much more adept than the average of our race.

Although our equipment seemed meagre, it also seemed heavy. Each man carried seventy lbs. ; when his turn came to carry the Bren gun he was carrying over ninety. (This was immediately after a supply drop, when he had a full load of five days' rations.) We averaged seven and a half to eight hours marching a day, halting an hour for breakfast and for three hours in the middle of the day, at which time we exchanged most of our signal messages. We started marching as soon as we could see, in order to get as much behind us as possible before it got hot ; and we usually bivouacked a few minutes before dark. We were not particular about where we bivouacked, except that it had to be away from a track, and we took care not to leave traces between the track and the bivouac. Most of our marching was done on existing tracks, but a new track cut by us was as obvious as an old one after the passage of a column ; it had to be five feet wide to clear the mule-loads.

A night's sleep was usually nine hours, but it wasn't a minute too much and it was always an effort to get going in the morning. There was no need to be cautious about fires ; smoke may with really bad luck betray a bivouac, but flame

never will—provided you are well off the track. We felt quite secure with a couple of listening posts, sometimes with only one. If the countryside was dry, we took care to keep away from water, since it is by the rare water that the enemy's scouts will seek you.

Food

Food was a serious problem. A supply drop occupied something like six hours, what with getting ready for it, having it, collecting it and distributing it; so we had one only once every five days. In 1943 a day's ration was twelve biscuits, two ounces of dates, two ounces of cheese, some nuts and raisins, acid drops, tea, sugar and milk, and some very nasty cigarettes. (We used to say: "Have one of mine: I get them specially flown from India.") Unfortunately in 1943 the theory was that seven days' rations must last ten days, and this was woefully inadequate. Furthermore, for various reasons, we got very few drops, and we all wasted away very quickly.

The following year we got American "K" rations, and although we got very tired of them they were excellent from the point of view of nutrition and kept us well; we never had less than three pounds of food a day. We should have sold our nearest and dearest relations either year for bread or bully beef, and none of us will ever have much sympathy in future for the soldier who complains of having too much of either. The only real snag to the "K" was that, in deference to medical opinion, all the items were salty; the result was a devastating thirst after every meal, and water was often scarce.

One bad mistake was made, however, before the 1944 expedition. If men are going to be a long time on arduous marching on short commons, it is essential that they be extra well fed beforehand, so as to build up a hump. The ordinary ration is inadequate for this purpose. To say this does not constitute, as we were told, an "attack on accepted ration scales," which are perfectly all right for normal work. What we wanted and needed was more meat, bread and vegetables; what we were allowed, after several weeks of negotiation, was an enhanced issue of milk and cocoa. Even the representations of the doctors did not avail us. This is a lesson which must be remembered if the circumstances ever arise again, because I am quite certain that our endurance in 1944 could have been higher than it was if we had been allowed to train on a more generous ration scale.

River Crossings

The last years of the late war produced some remarkable feats in the crossing of major rivers, which culminated, so far as British arms are concerned, in the crossing of the Rhine at Wesel and the Irrawaddy at Pagan. Our own experiences in this field of warfare are somewhat provincial by comparison, but we were proud of them at the time. In 1943 we all crossed the Chindwin, and most of us the Irrawaddy; many crossed both twice. Our equipment that year consisted of four two-man rubber reconnaissance boats and two round R.A.F. rubber dinghies to each column; and each column that year comprised 350 men and 90 animals. The Irrawaddy crossings, however, were mostly carried out in local boats, seized or hired for the occasion; the animals had to be swum or towed across, the choice depending largely on the temperament of the individual animal.

In 1944 my brigade crossed the Chindwin high up, above Singkaling Hkamti, and this time we did it in a rather more modern fashion. Before leaving India, we had arranged for assault boats to be fitted with outboard motors, leaving some

of my own Sappers behind with them to make sure that they were in running order when we needed them. When we reached the Chindwin we summoned them, and they were flown in by glider, the gliders landing on a shingle bank in the river under our noses. With their help we crossed the whole brigade, four thousand men and six hundred animals, without bother. One column belonging to the Queen's Regiment and consisting of 450 men and 65 animals, got across in just over two hours—the just reward for long hours of patient training in India. The last column put the assault boats and outboard motors back in their gliders, and Colonel Phil Cochran's pilots came back in their Dakotas, snatched them off the ground, and took them back to store in India. (Not so the Sappers, however; they joined in the walk with us.)

General Wingate

With this brief mention of some of the minor experiences of the expeditions, I must turn back to the point at which I began—to General Wingate and his ideas. Certainly his most direct contribution to the winning of the Burma War was the tremendous fillip which his successful exploitation of air supply gave to the development of that system. He used his influence, when he found himself in a position to do so, to bring to the South-East Asia theatre several additional squadrons of transport aircraft, and their presence in the theatre, available to be switched to other tasks than those for which he brought them, was a matter for which better men than I had cause to be grateful. His second contribution, less widely appreciated, was his devising of the system of direct air support by means of visual control posts or, as they are now called, Contact Cars (Air). In this field he was the pioneer, and his chief henchman was Wing Commander R. G. K. Thompson, D.S.O., M.C.

Wingate's conception of Long Range Penetration had travelled a long way from being a mere scallywag, raiding, sabotage performance. That could be better done, as he often said himself, by parties far smaller than his original force. But he saw and preached Long Range Penetration as something much bigger than that. He saw how in desert and in jungle, and indeed elsewhere, much of the country that has to be fought over has no real value, and that if it can be skipped, it is better skipped. Of what use to us, or to the Japs, were the many miles of territory which separated our armies in 1944 from their objective? He would leave the enemy to enjoy the useless miles between the Chindwin and the Irrawaddy, while we held him behind the one and seized our objectives beyond the other. That, shorn of the convincing detail which he could produce so eloquently, was the sort of military argument which he would expound. Nothing enraged him more than when his Penetration Groups were described as "detachments." He saw them as an integral part of the battle.

On the whole, he failed to convert current military thought to his belief in deep penetration. He certainly convinced his lieutenants; but deprived of his fiery leadership and teaching, I cannot hope to succeed where he failed. Short penetration, or the "short hook," found more favour; and one of his brigades, the 23rd, did a most useful short hook in the Naga Hills. They caught the Japs as they reeled back from their failure at Kohima, and gave them stick. That was after his death. He would have passed it, I know, as a permissible operation by his standards; but he would have denied hotly that it was the only permissible type of operation. He would have pointed out that it was part of a defensive battle, even though it was in the closing and winning stages of that battle; and the defensive irked him. He thought always in terms of the offensive.

I have heard it said, also, that the results of his campaign in 1944 showed only a five per cent. dividend for the comparatively large force given him; that is tied up with the comment which I have already mentioned, that we were too far in to influence the main battle. The answer to that, again, is that the main battle had been offensively intended; and that if the intended battle had been fought the dividend would have been higher. That was the year when the Indian Parachute Brigade was committed to battle on its feet, and the 2nd Division, trained for Combined Operations, fought six hundred miles from the sea.

Finally, there are those who say that the days of Long Penetration are over. I would only plead that this should not be assumed too readily as an axiom. Other campaigns may lend themselves to its use. For instance, in the final campaign in Burma I should have liked to see one brigade flown in to the Karen Hills between Burma and Siam, to block the exit of the Japanese withdrawing across them. The terrain was suitable, the local inhabitants were fiercely anti-Jap, lines of communication were easy to cut, there was jungle, there was water, there were potential landing grounds. The advance of the 14th Army was using every Dakota that could take the air, and the project could only have been maintained at the expense of one brigade out of the main advance; but it would have been a neat and exhilarating operation, which would have paid—shall we say?—at least 7½ per cent.

If I have dwelt too much upon Wingate and his ideas, it is because he was an inspiring leader, an infectious leader who did not tolerate commonplace and pedestrian thought, a leader who led us to and through an experience which we are glad to have had, and whose habit of constructive thought and powers of leadership are all too rare. His orders to some reconnaissance patrols in 1944 are worth remembering, as typical of his outlook upon difficult problems: "No patrol will report any jungle impenetrable until it has penetrated it." Coupled with that, we remember also Mr. Churchill's last reference to him in the House of Commons: "A man of genius who might have become a man of destiny." Those words are more than a fine phrase; they are a worthy epitaph.

DISCUSSION

MAJOR G. E. SCOTT: We have been told that Enemy Number One in the Burma campaign was scrub typhus, that Enemy Number Two was malaria, and that the Japs were Enemy Number Three. I wonder if the Lecturer could give us his views on that.

I have also one other small point. The Lecturer said that he obtained very reliable information from the natives. Natives may mean anything in Burma because there are many varieties of people, and I should like to know whether he classes them all together equally in usefulness from an intelligence point of view.

The LECTURER: I am very glad to say that my people never caught scrub typhus, which was prevalent mainly in the Hukawng and Mogaung valleys. Although it was pretty bad, it was only locally endemic, and we never seemed to catch it in our part of the North. Other brigades did, notably the 14th Brigade.

I am pleased to have an opportunity to explain that point about the "natives." One hears the word "Burmese" used as meaning all the inhabitants of Burma, which is wrong. In fact, there is a little rhyme which sometimes helps people to remember, namely:—

To call a Burman a Burmese
Is a thing that's unlikely to please,
For he may be a Chin,
Karen or Kachin
Or even an Arakanese.

In Upper Burma the Burmese live mostly by the Irrawaddy; the Kachins live in the mountains in the North, the Chins West of Kalewa, and the Karens down in the South and South-East. The Kachins were one hundred per cent. loyal, likewise the Karens. The Shans were charming people who politely inquired who was winning the war and, on being told, hoped that the other side would get out quickly. They would not risk their lives for us unless they had a lot of encouragement. The only people we know of who actually betrayed us were Burmese, but some of them did very well.

LIEUT.-COLONEL R. W. BARKER: I used to be in charge of a Sub-Division at one time in the Lower Chindwin district, and I should be interested to know how the villagers got on after we left.

THE LECTURER: Reprisals did take place against the inhabitants in some areas, yet in other places they got away with it completely. We went to immense trouble the first year to make it quite clear that we were only a raiding party. I do not say that everybody did, but most of us told the natives not to commit themselves too far in helping us, as we were going on and out. We did our best to safeguard them, but there were instances of reprisals. I believe that at Tigyaing, where we crossed the Irrawaddy in 1943, the Japs beheaded the local headman; but if they had beheaded the policeman there would have been some point in it, because the headman had refused to help us whereas the policeman had helped us. On the whole, the people looked after themselves all right and dodged reprisals by going off into the country. As a matter of fact, the Chinese carried out considerably more reprisals on villages which had been unfriendly to them than did the Japs.

MAJOR-GENERAL H. ROWAN-ROBINSON: I think the Lecturer said that his brigade marched right across country, and then afterwards I think that he said the 23rd Brigade played a very important part in the Battle of Kohima. I wonder if he would be good enough to enlighten me on that point.

THE LECTURER: The 23rd Brigade was not directly involved in the Battle of Kohima, but it caught the Japs recoiling from Kohima, where they had been engaged and beaten by General Slim's troops. The Japs reeling back from Kohima came up against the 23rd Brigade, which was comparatively fresh and, as it were, waiting for them.

THE CHAIRMAN

We are all very glad that Brigadier Fergusson has been able to tell us something about the heroism of the British troops in Burma, heroism which during the War was concealed from us and the world by what I can only describe as hidebound censorship regulations.

One of the things that has always surprised me is the way the British troops managed to find their way about the jungles of Burma. I spent many years hunting big game in the country over which the Chindits operated, and I never ventured a yard without a Burman or a Kachin. It is a remarkable example of the adaptability of the British soldier that he could find his way about those jungles in such strange surroundings.

The Lecturer has thrown a flood of fresh light on a campaign which puzzled many of us at the time. For instance, we have heard to-day that the first Chindit expedition was planned as a minor part of a big operation, but that it eventually went in alone, so it is not surprising that it came up against great difficulties and suffered severe losses. It did, however, establish one very important fact and that was the possibility of maintaining troops by air in Upper Burma, although it is just about as unsuitable a country for air supply as you could find anywhere.

We have also been told how in 1944 the far more ambitious operations by what amounted to nearly two divisions were completely upset by the Japanese offensive towards Imphal and Kohima, but General Lentaigne, who succeeded General Wingate,

did achieve something very definite. I think it is not too much to say that his brigades extricated General Stilwell from the awkward situation into which he had got himself when the monsoon broke. Moreover, the operations established the principle of air supply beyond any shadow of doubt, and General Slim, when planning his great operation towards Mandalay, could count with certainty on a well-proved system, particularly as the country round Mandalay was far more open than that in which the Chindits had been fighting.

The Lecturer laid stress upon the wonderful co-operation between the air and the ground during these operations, and they do show what can be accomplished by close integration. The main lesson which emerges from the lecture is that air supply may go far to revolutionize both strategy and tactics in the future. We may have to change some of our former ideas. For instance, we have always thought that the deserts, mountains and jungles which separate India and Burma from the rest of Asia were a fairly effective obstacle to invasion. It would, I think, be a very bold man who would say that to-day a modern army-cum-air force could not penetrate such barriers comparatively easily. If that is so, then the conclusion I draw is that those who are planning the political futures of those countries will do well to bear in mind that physically they are now wide open to invasion.

That is all I have to say, except that I am sure we are all pleased to see the Lecturer looking so well after his adventures and that we thank him for a most interesting and instructive lecture.

The customary votes of thanks to the Lecturer and Chairman were carried by acclamation.

THE NAVIES OF THE WAR

A REVIEW ARTICLE

By "NAVARINO"

THE first post-war *Jane's Fighting Ships* is the greatest pictorial record of the world's warships ever published, and it is fairly safe to prophesy that never again will there be so many and such varied armed vessels to be described in any Annual.[1]

Now has come the time, not merely for drastic weeding of worn-outs and time-expireds, but for reviewing every bit of naval construction in the light of future requirements, so far as they can be foreseen. This means that only the pick of all the ships portrayed in this publication will survive, although some may linger on for a while in secondary service, and even the latest designs will be scrutinized more closely than ever before to see whether they can still be taken as a basis for future construction or whether they must be regarded as temporary expedients until something drastically different can be designed and built.

Already there is loose talk about the atomic bomb and the modern aeroplane having rendered all surface warships useless. Such assertions ignore the fact that we need a Navy now—and may it be for many years to come—to assist in keeping peace—a condition of the world which cannot be maintained by atomic bombs. Furthermore, if in a future war sea communications are to be secure, merchant ships must have close escort, and this cannot always be provided by aircraft. In turning the pages of *Jane* to decide what kind of warships we should keep and what ought to be scrapped, we should, therefore, first answer two leading questions :—

(1) What sort and size of Navy do we need for peace-time policing ?

(2) Will a Navy limited in types and numbers of warships for that function alone provide us with the fleet we should require instantly on the outbreak of war ? If not, what else do we need ?

Having settled to his own satisfaction those fundamental problems, the naval student can then begin the fascinating task of selecting and rejecting from this great illustrated catalogue. Space will not permit us accompanying him in this pastime, and all that can be attempted in this article is to remark on the trend of design in each of the well-established classes.

BATTLESHIPS

Because she is the most expensive class of warship, the battleship has for the last quarter of a century been a target for criticism—usually singularly ill-informed or biassed. It is argued that the days of duels between main fleets are over ; that battleships are easy meat for air attack (*vide* the "Prince of Wales") ; that the aircraft carrier has superseded the battleship as the provider of the main striking force of a fleet ; that the battleship means too many eggs in one basket. Let us briefly examine these assertions in the light of the late war.

It is true that no battle on the scale of Jutland was fought between 1939 and 1945, but battleships played a vital part in the battle of Cape Matapan when the Italian fleet might have made an end of us in the Mediterranean. Again, it was battleships which countered the desperate thrust of the Japanese force which

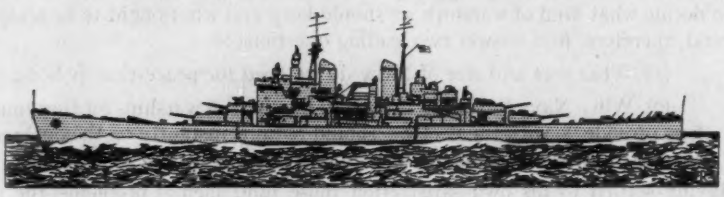
[1] *Jane's Fighting Ships* 1944–45. Edited by Francis E. McMurtrie, A.I.N.A. (Sampson Low, Marston & Co.), £3. 3. 0.

threatened the great American landing in Leyte Gulf—the beginning of the whole build-up of the final advance through the Philippines.[1] It is interesting to note that both these actions took place at night.

No one will dispute that carrier-borne aircraft now provide the long-range striking force of a fleet: they are the spear-head, but the record of the greatest and latest air-sea-land campaign—the advance from America to Japan—shows clearly that the battle fleet is the shaft without which the spear-head cannot be driven home.

Battleships have been used again and again, and up to the very end of the War, for direct assault on the enemy's coast. It is arguable whether they are the best type of ship for that purpose, but it is proof that, with the air cover indispensable for any and all surface ships in such conditions, their size does not make than an easy prey for air attack; on the contrary their tough armour and powerful anti-aircraft armament make them less vulnerable than lighter and smaller ships, such as the cruiser or destroyer.

That the two principal Sea Powers have ceased to build battleships for the time being is not to be wondered at, for the menace of hostile battle fleets is, for the present, at an end, and their navies have a plethora of these as of lesser ships. It is of interest to note, however, that four British battleships were built during the War and the "Vanguard" was completed even after hostilities had ended, while the United States built no less than ten battleships between 1941 and 1944, and construction on an eleventh ship, which was suspended for a time, was renewed in December, 1944.



H.M.S. "VANGUARD"

Much interest naturally attaches to the "Vanguard" as the last word in British battleship design. *Jane* went to press too early for a photograph to be included, but we are indebted to the Editor of that publication for the accompanying silhouette. This and photographs which have appeared in the Press show that she bears a striking resemblance to the battle cruiser "Hood." The quadruple turrets in the "King George V" class and triple turrets in the "Nelsons" have given way to the twin turrets which were the time-honoured main armament of battleships in the days before naval treaties, and the calibre and disposition of the main armament of eight 15 in. in the "Vanguard" is identical with that of the "Hood." Sixteen 5.25 in. guns in the battleship compare with twelve 5.5 in. and eight 4 in. in the battle cruiser; but there is a much greater array of multiple A.A. weapons. Details of armour have not yet been made public; but it may be taken for granted that the "Vanguard" is well up to battleship standard in protection of every kind, whereas the "Hood" was

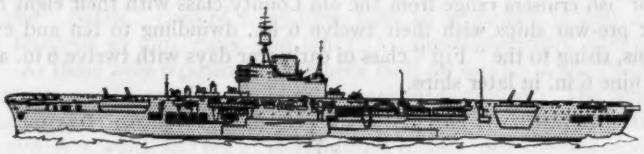
[1] See Discussion after Lecture by Captain K. M. McManus, U.S.N., on "The Battle for Leyte Gulf," in the JOURNAL of November, 1945, pp. 499–450. *The Lecturer:* . . "I agree that the battleships were the backbone, and the outcome might indeed have been different if they had not been there."

unduly vulnerable or a ship of her size. It is all the more remarkable, therefore, that with a reputed speed of 30 knots—practically the same as the battle cruiser, the "Vanguard" should displace only 42,500 tons to the "Hood's" 42,100.

The latest American battleships are the largest, most powerfully armed, and fastest capital ships ever built. Displacing 45,000 tons (52,000 full load), they carry nine 16 in. guns in triple turrets, twenty 5 in., and eighty 40 mm. A.A. Their speed is reported to be about 33 knots. Five more ships which would have displaced 58,000 tons and carried twelve 16 in. guns were cancelled.

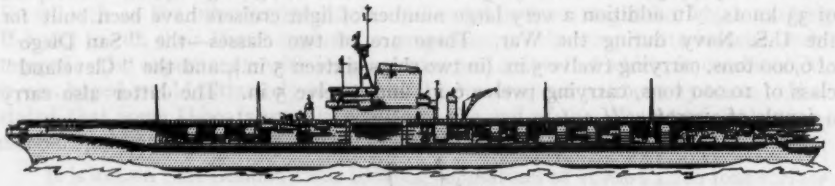
Aircraft Carriers

Whatever may be the fate of the large battleship, there can be little doubt that the aircraft carrier has come to stay; not only has she refuted those prophets who forecast that her vulnerability would make her useless in war, but she has become the most important type in a modern fleet. It is not too much to say that the carrier has long ceased to be an auxiliary to the battleship and that their roles, in that respect, are not infrequently reversed.



H.M.S. "Implacable"

British fleet aircraft carriers now displace 30,000 tons or more and carry only a light A.A. armament of sixteen 4.5 in. guns. Such are the two "Implacables," the "Indomitable," and the three ships of the "Illustrious" class. Details are now given in *Jane* of a class of light fleet aircraft carrier—seven ships of the "Colossus" class and five, very similar, of a "Majestic" class. (It is interesting to see how time-honoured battleship names are being given to carriers). These displace only 14,000 tons and have a speed of 25 knots.



U.S.S. "Midway"

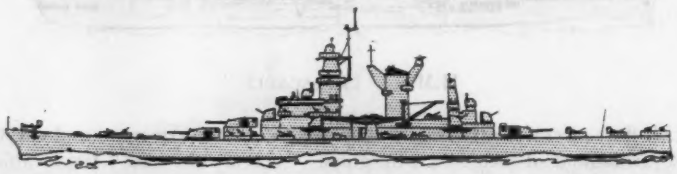
Many details are given of the new large fleet aircraft carriers of the U.S. Navy. Displacing 45,000 tons, they carry 137 aircraft including large bombers; they have a speed of 33 knots and their A.A. armament consists of eighteen 5 in. and eighty-four 40 mm. A.A. guns. It is officially stated that they are protected by heavy armour and are well subdivided in water-tight compartments.

Although the modern carrier does not differ greatly in outward appearance from pre-war designs, it is obvious that she is a much tougher ship than she used to be and the remarkable way in which carriers of both the British and American Navies have stood up to Japanese suicide bombers is proof that they are no longer more or less protected hulks with a light superimposed box-like structure for a hangar, but ships well armoured overall and with such a formidable A.A. armament that they can resist air attack as effectively as any other man-of-war.

The escort carrier is another type developed in the War and now as firmly established as the cruiser of old as being indispensable for the defence of shipping on the high seas.

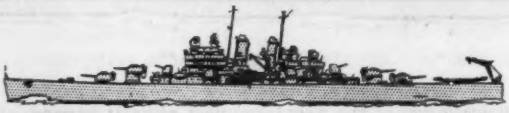
CRUISERS

What can we say about that maid-of-all-work, the cruiser? That she, in all her guises, did most valuable and versatile service during the War is well known; she was at times deputising for the battleship; she provided the backbone of escorting forces for large convoys; she was used for bombarding; she carried troops and provided landing parties. Nevertheless, no class has reflected such uncertainty of purpose in design. British cruisers range from the old County class with their eight 8 in. guns to the last pre-war ships with their twelve 6 in., dwindling to ten and even eight 5.25 in. guns, rising to the "Fiji" class of early war days with twelve 6 in. again, and lapsing to nine 6 in. in later ships.



U.S.S. "ALASKA"

The United States have even resuscitated the battle cruiser in the "Alaska" class with nine 12 in. guns with, apparently, only cruiser protection, but having a speed, according to *Jane*, of "possibly 35 knots." The more orthodox American cruiser is now a ship of 13,600 tons carrying nine 8 in. and twelve 5 in. guns, and with a speed of 33 knots. In addition a very large number of light cruisers have been built for the U.S. Navy during the War. These are of two classes—the "San Diego" of 6,000 tons, carrying twelve 5 in. (in two ships sixteen 5 in.), and the "Cleveland" class of 10,000 tons, carrying twelve 6 in. and twelve 5 in. The latter also carry a couple of aircraft.



U.S.S. "CLEVELAND"

Granted that ship designing is war time is in some degree a matter of expediency to facilitate construction, it would appear that the time has come to review the cruiser

as a type in the light of her probably future role, especially *vis-à-vis* the aircraft carrier, the escort carrier, and the large destroyer, and perchance the rocket ship, and to evolve a standard design.

Destroyers

Destroyer design has been more stabilized than that of cruisers, although the tendency has been for displacement to increase in order to meet the developments of armaments and their control. The numerous "Hunt" and "Blankney" classes, which came into production in the first years of the War, were in effect miniatures of the "fleet gunboats" advocated by the writer of this article in 1936[1] in that they had surrendered their torpedo armament because their business was essentially to fight with their guns, leaving the torpedo to the destroyer proper. But they had their limitations, for they were small ships of 1,000 tons with a speed of no more than 27 knots; as such they were useful at a time when quantity rather than quality was in demand.

Torpedoes have remained as part of the armament of subsequent destroyer designs, full details of which are given in this year's *Jane*.

The new "Battle" class of 2,325 tons, have an armament of four 4.5 in. and twelve or fourteen 40 mm. guns, and ten 21 in. quintuple tubes, and a speed of 36 knots. As these were reputed to have been built for service in the Pacific, it is of interest to compare them with the latest American destroyers. The hundred odd ships of the latest "Gearing" class displace 2,400 tons and are armed with six 5 in. and twelve 40 mm. A.A. guns, and ten 21 in. quintuple tubes; their speed is reported to be "over 35 knots."

Submarines

The submarine, like the aircraft carrier, is a type of warship with a definite future. Any idea that they can be excommunicated by international agreement has been shown to be futile; equally so was the convention that they were not to be used to sink merchant ships at sight. If, unfortunately, war should recur it will be once again total war, and the submarine, like the aircraft, will certainly play its part.

As the weapon with which Germany had hoped to win the war at sea her latest submarines are of particular interest. Much information about them has yet to be published, but *Jane* recalls some particulars which have already appeared in the Press, such as the introduction of the *Schnorkel* or breathing tube, which enabled U-boats to run their Diesel engines for propulsion or charging batteries while submerged; also experiments with jet propulsion and a new fuel which, in combination, it was hoped would ultimately increase under-water speed to about 25 knots. It is stated that some U-boats were in service at the end of the War which had a submerged speed of 20 knots and a reputed surface speed of 30 knots.

It is known that Germany was building submarines of at least 1,200 tons surface displacement towards the end of the War, and that after 1943 nearly all U-boats were rearmed with A.A. guns, usually one 37 mm. and four 20 mm. (paired).

Britain was still turning out the successful "T" class craft when hostilities ceased: submarines of just over 1,000 tons surface and 1,500 tons submerged displacement, armed with a 4 in. gun and ten 21 in. tubes, and having an above-water speed of 15 knots and an underwater speed of 9 knots.

[1] See "Fleet Gunboats," by "Navarino," in the JOURNAL for August, 1936.

The hundred and twenty U.S. submarines of the latest " Balao " class displace 1,526 tons and carry a 3 in. (in some cases a 5 in.) gun and ten 21 in. tubes. They have engines described as developing 6,500 B.H.P.=21 knots.

Miscellaneous Types

Space will not permit mention even of the great variety of other types of warship produced in the War. Of many it can be said we shall not see their like again; but our peace-time Navy will surely have to keep in being appropriate vessels for minelaying and minesweeping, if only to ensure that these shall not become lost arts and that we may be ready to produce the best designs in large numbers should the need ever arise.

This goes no less for Invasion craft. Here particularly there is ample scope for a review of the innumerable different types, many of which were described in a previous article.[1] Very many of the landing and support craft used in the late war were hurriedly extemporized or converted and, while for the most part they did the job at the psychological moment, they were often hell ships for their crews and passengers. Too often it has been assumed that craft can be slung together to provide for some temporary contingency and that living conditions are therefore a secondary consideration, yet when the time comes they have to make sea voyages and remain manned for much longer periods than was ever expected. It is not a case of pandering to comfort—a tendency in the bigger ship of to-day, but of ensuring efficiency by designing a vessel equipped for men to live in and not merely a floating platform. The Landing Craft Gun and Landing Craft Rocket, as the extemporized Coast Attack ships of the later years of the 1939–45 war, compare very unfavourably in this respect with the monitors—big and small, built through the foresight of Lord Fisher in 1914–15: and except for a few such craft for training and experiment with a view to improvement the verdict may well be " scrap the lot " and start again.

It would be ungenerous to close this article without paying tribute to the labours of Mr. McMurtrie who, as Editor, has been mainly responsible for this monumental edition of *Janes' Fighting Ships*, on the production of which he and the Publishers are to be sincerely congratulated.

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[1] See JOURNAL for May, 1945, p. 212.

OPERATIONS—HIGHER FORMATIONS

A POST-WAR REVIEW OF FIELD SERVICE REGULATIONS, VOL. III

By Brigadier R. M. P. Carver, C.B.E., D.S.O., M.C.

TEN years ago the first and only edition of a new volume of Field Service Regulations for the Army was published. It was entitled "Operations—Higher Formations." It is interesting to read it again now with the experience of six years of war behind us and the prospect of atom bombs before us. There are many questions we can ask ourselves as we turn over again the pages we have not thought of looking at since the days of promotion examinations. How much of it was mistaken at the time—out of date in December, 1935? How much of it had become irrelevant or misleading by September, 1939, less than four years after publication? How much of it is still relevant, likely to be of use to a hypothetical case—a General in 1946, responsible for the preparation and conduct of higher operations but without experience of them in the last six years? (I trust no such hypothesis could be translated into reality.) Lastly, how much of this slim volume is of any value in training our Army for its future tasks? If we were to sit down and rewrite F.S.R. Vol. III for the student of 1946, would we have to throw the whole volume into the fire and start afresh, with entirely different headings and subject matter, or could we re-hash, correcting here and there, inserting the new, deleting the old as we went along?

MISTAKEN THEORIES OF 1935

Chapter III—Preliminaries to Battle

Let us first consider how much we can now see to have been mistaken or out of date in December, 1935. Chapter III—The Preliminaries to Battle, is undoubtedly the part that calls for most comment. There is little with which to find fault in the general principles and descriptions given in other chapters, bearing in mind the equipment of armies when the book was written. In this connection, the opening lines of Chapter III, Section 10, paragraph 5 give the clue: "Since the majority of fighting troops will consist of horsed artillery and infantry moving on foot, whose rate of progress governs the pace of operations as a whole, the considerations given in the following paragraphs have reference mainly to marching columns." In December, 1935, that was generally true of the European armies on their peace-time footing; it was not true of our only expeditionary force at that time—the small mobile force waiting at Mersa Matruh for fear that the Italians would invade Egypt as they had Abyssinia.

Assuming that it was true, I still maintain that the picture drawn in Chapter III of the Preliminaries to Battle was fundamentally false. Its effect on problems of training, involving advance guards, covering troops, mobile troops and light forces, was long in dying and still persists in the minds of those who have not been able to forget theoretical battles in the English countryside. The picture which this chapter gives us is one of two armies of approximately equal strength and equipment concentrating in the plains of Europe at a considerable distance from each other; and then gradually approaching each other, manœuvring for an advantage, their mobile forces free to wander at will, able to pierce the enemy's "protective screen" and observe his marching columns, wending their way across Europe in column,

line or echelon. Those conditions might perhaps prevail in theory at the very beginning of a war, such for instance as one by Great Britain and France against Russia, with the whole of Central Europe standing by impassive, not resisting the violation of their neutrality by either side. I can think of no other situation which might produce the conditions described in this chapter, and that situation is an impossible one.

There is no doubt that the writer felt that the Great War had been fought on very wrong lines, and he used his imagination and his knowledge of history to produce a picture of the opening stages. It is true that the conditions he envisaged, horse and foot being the decisive factor in movement, are closer to those in which Sherman, Wellington, Marlborough and Cromwell fought, than to those of the *blitzkreig* to fall on Europe a few years after the publication of this book. That does not excuse the complete fallacy of the picture here presented. Wars have up to now always begun with the violation of a frontier by crossing it with an army, by a sea landing or by an airborne landing. They come as the climax of a period of tension and find each side arrayed, however weakly or inadequately, to meet the blow.

When Marlborough marched to Blenheim, he was not gradually approaching an unknown enemy, feeling, probing and manœuvring for position ; his methods were far more akin to those of Hitler's *panzer* armies in 1938, 1939 and 1940 than to those described in this chapter. He had decided what he was going to do and made all preparations to do it. Having decided and made the administrative and diplomatic preparations, he moved as much like lightning as anybody could in those days. A better description of the Preliminaries to Battle would have been one of two dogs crouched a few inches apart, ready to leap at each other's throat the moment one showed a sign of weakness.

I do not suppose for one moment that any staff officer in 1936, preparing a plan to deal with a definite eventuality, would have been influenced by this chapter. He would face the facts before him and base his plan accordingly. He would, however, find when he came to put that plan into action that his troops had been trained to expect quite different preliminaries to battle than being dive-bombed in billets or moving long distances in motor transport, hurriedly digging-in on arrival amid a crowd of refugees and a spate of rumours about omnipresent *panzers*.

When we turn to the value of the Regulations to those charged with the conduct of higher operations at the outbreak of war, we see the revolutionary change brought about by the mechanization of the entire Army. If the picture painted in Chapter III was misleading in 1936, by 1939 it was completely out of date.

Chapter IV—Command and Control

Turning to Chapter IV—Command and Control, there is no reference to wireless. The idea of dividing a headquarters into main and rear is viewed with disfavour, to be considered only as exceptional and temporary, and the possibility of forming a small mobile tactical headquarters is not suggested at all. This is no doubt due to the slowness with which the idea of the universal use of R/T was and still is accepted. It is true that when this volume was written, small mobile sets with any great range were in an early stage of development, but by 1937 we had the No. 9 set, still in use ; and the absence of any reference to wireless in this chapter makes it completely inapplicable to 1939, and may have been one of the reasons for the failure to use R/T in France in 1939 and 1940, and the prejudice against it which still exists in many quarters.

Chapter V—The Offensive Battle

In Chapter V—the Offensive Battle, it is surprising to find how much of the paragraphs on the main attack and the pursuit are still applicable and were so in 1939. Criticism centres again on the description of the preparatory period and the first paragraph, entitled "Envelopment and Penetration." I can see the military critics and correspondents, the historians and all the armchair soldiers rubbing their hands with glee as these mystic words come before their eyes. Shades of Clausewitz, Moltke, Foch, Liddell Hart and company pass before them, as the clichés and platitudes of military theorists rush to their lips. It is an unreal picture which is conjured up here; the best corrective to it is to be found in the quotation from Winston Churchill's *Life of Marlborough*, which is placed as an Epilogue to this article.

Perhaps I am being unfair. My own experience is that, as a student of war without experience of it, these theories about envelopment and penetration left me bewildered. I could not imagine how any commander ever made up his mind; there were so many pros and cons; appreciations would drag on to an interminable length, considering the state of the moon and a hundred other factors. In fact of course in war it turns out to be so much simpler. It is seldom that there are more than a very few courses of action which are possible; sometimes only one, the only decision being a question of timing.

Let us see what Field-Marshal Montgomery has to say about it. In a pamphlet on High Command in War he says: "The exact method that a commander will adopt in order to set about his enemy will depend on varying circumstances. During months of hard fighting I have found that no two problems are ever the same. A commander must keep an open mind, consider the conditions of the problem very carefully, and decide on a method suitable to the occasion. During pauses while the land battle is being built up, the air forces must be very active; they should interfere with enemy movement, destroy communications, disrupt his supply organization, and generally carry on the battle while the Army is preparing to deliver its main blow. In mobile operations where it is necessary to strike hard and deep and to penetrate quickly into the enemy country, divisions should operate on narrow fronts on main axes of advance. If the enemy is widely dispersed in his endeavours to stem the advance, he will not be able to hold these 'divisional thrusts.' The time may come when the enemy will recover his balance and will stabilize the battle on some rear position. When this happens, two or more thrusts should be inclined towards each other, so as to converge on the vital or key locality in the enemy position; you then fight a Corps battle for that key locality, the fire of the artillery of the Corps being concentrated and handled by the C.C.R.A. In close country, objectives for divisional thrusts should be the main centres of road communication. It will generally be found that the possession of these main centres will enable you to put a stranglehold on enemy movement and thus dominate the operations."

There are two main criticisms besides to be made about this Chapter V. First, the absence of stress on how decisive are the parts played by problems of administration, movement and traffic control in forming the plan of campaign or of battle; second, the relegation of the part of the air force to a short paragraph at the end. The last three words of that paragraph "under his control" should be altered to "at his call." Modern methods of communication and control of aircraft have entirely done away with the idea that formations of aircraft should ever be put

under the direct control of Army formation commanders. That long controversy, so bitter in the early days of the War, is not yet completely dead, but it should be.

Chapter VI—The Defensive Battle

Chapter VI—the Defensive Battle, was of particular interest in 1939 and is one with which the British Army is always bound to be faced at the beginning of a war. The considerations set out in this chapter appear to neglect two main points. First, the vital importance of the security of fighter airfields. Air reconnaissance and attack are the first line of defence and the surest means of reducing the scale of attack, delaying it or breaking it up altogether. The whole plan of defence may well hinge, therefore, on the location of fighter airfields. Secondly, the decision as to whether or not to try and hold a continuous defensive line. This must be related to the strength and equipment of the troops available. A continuous defensive position, which is not practically impregnable, such as those of either side at El Alamein, is almost useless. Once the enemy has broken into it, the whole system collapses. The commander will have to decide therefore what areas are vital to him, such as his base or his airfields, and either withdraw until the area he holds can be securely held by the troops available, or be prepared to accept the fact that garrisons of vital areas are surrounded and cut off from their base. Tobruk in 1941 is almost the only recent example of such an isolated fortress surviving, and that was not entirely cut off, as communication by sea was maintained at great loss.

In order to fulfil these two requirements, the maintenance of air cover and the restriction of the area to be held to the strength of troops available, it will always be necessary to make sacrifices of territory or of Allies, sacrifices which might be resisted with all the pressure which politics and diplomacy could bring to bear. The experience of the first three years of the late war provides proof enough of the disastrous consequences of not cutting your suit according to your cloth, and of the fallacy of trying to hang on to every inch of a long land frontier. The experience of the Germans in the last three years of the War is proof again, witness Stalingrad.

So much for the general considerations affecting the defence. In the paragraph dealing with the conduct of the defence, the picture painted of the outpost force is somewhat unreal. Wide areas of " no man's land " are rare. They existed in the desert and perhaps in the jungle. It would be better expressed perhaps if it were made clearer that it is the duty of both sides, if their main bodies are separated in any area, to dominate the area in between with patrols and at all times to maintain contact with each other. We have always been reluctant to weaken the main position in order to provide a subsidiary outpost position forward of it to bear the main brunt of the attack, for in modern war the defenders of this position stand no chance of survival, a forlorn hope indeed.

The Germans, particularly in the Normandy beach-head, made a practice of holding the forward edge, the first thousand yards of their defensive system, comparatively lightly; but strongly enough to force us to lay on a full-scale assault. Their main defence, particularly anti-tank defence, lay behind. This inevitably entailed the loss of the forward part by artillery fire, or by being over-run by the assault, wherever we attacked; this they preferred to a break-through, which was the alternative.

It is largely a question of man-power and morale; whether or not you are prepared certainly to lose so many men every time you are attacked, and again whether or not you can make your defenders fight when they know themselves to be a forlorn hope. The idea of an outpost position which you are at liberty to withdraw before the attack begins was well out of date by 1939, if not before. No mention is made of defence against airborne troops, the need to provide for it further reducing the number of troops available to hold the front line.

Chapter VII—The Withdrawal

The last Chapter, Chapter VII, deals with The Withdrawal. There are few points of criticism here. Again the decisive effect of the existence or absence of air cover is hardly mentioned. Without it a successful withdrawal is hardly possible, particularly if hours of darkness are short. Mention should be made of the desirability of using a separate formation headquarters to reconnoitre, organize and command the next main defensive position in rear, and the need for the establishment of control points on all approaches to it to direct units or stragglers to their post in the defence. Control by the formation in contact with the enemy is always liable to break down; if there is an organization ready behind it, it can take over troops, units or formations as they fall back, whether under or out of control. Warning should also be given of the danger of false orders and information.

Apart from these points, most of what is said is as true now as ever. The final paragraph on demolitions and devastations makes no mention of systematic mining of roads, railways, airfields and docks, nor of the vital importance of the destruction of dock facilities. This chapter does not include any mention of the problem of evacuation by sea—an operation which British armies in almost every generation have been called upon to face.

HOW MUCH IS APPLICABLE TO-DAY?

Let us now consider how much is applicable to operations in 1946, leaving aside the first chapter, which will be discussed later. Much of what has been said already about its relevance in 1939 is also of course applicable to 1946.

The greater part of Chapter II—the Preparation of a Campaign, is still applicable, though greater stress should be laid on the establishment of air supremacy over the area of concentration and the sea, land and air routes to it, and on the importance of administrative planning. In the early stages of a campaign, air, administration and shipping are likely to be the main factors limiting freedom of action.

Chapter III has already been fully discussed. In 1946 the use of air bombardment and of airborne troops will take a prominent place in the preliminaries to battle.

Chapter IV—Command and Control, should include reference to the need for the permanent subdivision of formation headquarters into tactical, main and rear, and the need for them to be mobile, the use of R/T and intercommunication aircraft, and the vital importance of combined Army/Air headquarters.

In Chapter V—The Offensive Battle, pride of place should be given to the air plan, the need to establish air superiority before the land offensive can begin, the disruption of the enemy's communications by land, sea and air, the isolation of the battlefield, and direct support of the land battle. Secondly, the part to be played by airborne troops, the timing of it and whether or not the action of other

formations is to be dependent on the weather being suitable for the airborne assault. Other important points would be the creation and execution of the cover plan, the allotment of armoured brigades, of specialized armour and other special weapons and troops; of amphibious craft for crossing water obstacles; the possibility of amphibious operations to turn a sea flank; priorities in air support and the allotment of special teams for the control of direct air support; the use of artificial moonlight or of major smoke screens; the provision and issue of special equipment for specific purposes; the allotment of areas and routes for concentration, traffic control and timings, including if necessary the construction of new routes; the maintenance plan, including allotment of maintenance or roadhead areas, allotment of maintenance routes, priorities over bridges or through bottle-necks; special arrangements to deal with refugees and the civil population in general; liaison with special forces, guerrillas and Allies; arrangements for briefing and security, including the imposition of wireless silence. Finally, arrangements for exploitation; the employment of armoured divisions; re-grouping of formations, including grounding a proportion of the force; the withdrawal of a formation headquarters to plan the next major operation; arrangements for the organization of the L. of C.; dissemination of information, including allotment of maps, special overprints and air photographs. It is doubtful if personal reconnaissance by the higher commander from an aeroplane of the area of the intended operation will be of much value. Much of what is written in the paragraph about the main attack is still applicable, but the list of matters to be dealt with in the preparation of the attack will be very much larger.

Some of the general considerations in Chapter VI—the Defensive Battle, have already been touched on. Once the decision has been taken as to what is to be defended, the main problems for consideration will probably be: the policy regarding minefields; the allotment of armoured brigades and the positioning and employment of armoured divisions; defence against airborne attack and the general policy to be adopted regarding firing at aircraft, particularly at night; the policy regarding construction of defensive works and inundations; the amount of transport to be held in the forward area; arrangements for the immediate concentration of the maximum air effort against the enemy's main attack when detected; the defence of the base and nodal points on the L. of C. against long-distance projectiles.

In the Withdrawal—Chapter VII, the first consideration will be the plan for the maintenance of air superiority; the stages and the rate of withdrawal will be largely dependent on the position of airfields and the rate at which anti-aircraft defence and ground staffs can be transferred to rear airfields, enabling squadrons to operate from forward airfields up to the last moment and operate again immediately on arrival at the rear airfields. The traffic plan and arrangements to deal with refugees and the civil population will take a high priority. The plan for demolitions and mining and responsibilities for them, including the ploughing up of airfields, must be co-ordinated, and the policy decided about destruction or damage to civil installations such as electricity services, inland waterways, telephone exchanges, water supply and railways.

If evacuation by sea is likely to be the final outcome, the earlier that naval representatives are brought into the planning the better; air cover and anti-aircraft defence of the beaches or ports will be of the highest priority. Permanent guards must be put on important bridges and defiles to guard against airborne attack or sabotage. It will be essential to appoint special officers to patrol main routes and important junctions to deal ruthlessly with obstructions and prevent panic.

Consideration should be given to the possibility of aircraft operating as freely and effectively by night as by day.

WHAT OF THE FUTURE?

So much for the difference between 1936 and 1946. What of the future? The task of the author of such a volume is invidious. He is not an irresponsible critic, able to create forces of his own choice suitable to his own theories and lay down principles for their employment. He is limited first of all by the fact that the size and shape of the British armed forces is determined in peace time by the requirements of Imperial, at present World, policing; by the proportion of the national expenditure in finance, man-power and production a democratically elected Government is prepared to allot to them; and by the necessity to produce principles and methods of warfare applicable to war in circumstances which, if they may be foreseen, may never be explicitly stated. In addition, he must try to foresee not only what the equipment and conditions of warfare will be at an unknown date, but also make it applicable to the organization on which the armed forces will be able to train.

What are likely to be the main developments in the next twenty years? First there is the atom bomb. Even if atom bombs are never used again, as gas was not in the late war, the range and destructive power of bombs, whether delivered by piloted aircraft or by automatic means, will increase immensely, as General Arnold and General Marshall have pointed out so forcibly. Airborne troops have come to stay and the carriage of heavy equipment by air will become possible.

Is any part of the first Chapter of this volume—the Employment and Command of Armed Forces, still applicable? The first section on the nature of war is still generally true. The part played by the air arm, including pilotless projectiles, needs greater emphasis. There is the possibility now of a decision being obtained by the use of atom bombs alone, provided that the enemy's source of power is sufficiently concentrated. Consideration should be given to whether or not defence of the United Kingdom, the main base, against all forms of projectile which can be launched from beyond the sea, should not be in the hands of one Service.

The next section deals with the control of the armed forces in war. This needs bringing up to date; the development of the Joint Staffs during the War is well known. I will not enter now into the problems which have often been discussed for the establishment of a permanent Joint Staff. The whole problem of the greater integration of the three Services is beyond the scope of this article.

The next section deals with the Principles of War. Are these immutable? Have any of them become obsolete or are there any additions to be made? The first to be mentioned is the necessity for having a clear aim and of relating everything according to its contribution towards that aim. Recent revelations of the direction of the War by the German High Command show more clearly than anything how much their downfall was due to lack of any consistent political aim, and how much our victory was due to the acceptance by ourselves, the U.S.A. and the U.S.S.R. of the common aim of the unconditional surrender of the Axis powers. None of the other accepted Principles of War can be discarded. Modern developments lend greater importance to surprise and offensive action at the beginning of a war. Are there any further Principles we should add to the present seven? In his pamphlet, quoted above, Field-Marshal Montgomery states them to be: Air Power, Administration, The Initiative, Morale, Surprise, Concentration, Co-operation and Simplicity. Later in the same pamphlet he says: "The whole essence of modern

tactical methods in battle lies in the following factors: Surprise, Concentration of Effort, Co-operation of all Arms, Control, Simplicity and Speed of Action." He does not include Security, but in all his pamphlets lays great stress on the importance of maintaining "balance," which amounts to the same thing.

CONCLUSIONS

To sum up. In 1936, F.S.R. Vol. III was as clear a guide as could be written on the conduct of operations by higher formations, except, I believe, in its conception of the preparatory period before battle. If anything, it did not lay sufficient emphasis on the importance of the air arm. It soon, however, became out of date as a result of the mechanization of the Army, the development of air power, armoured formations and wireless. Now it is almost entirely out of date, except for a description of the nature of war and its general principles, together with the main considerations to be borne in mind in the main attack and the withdrawal.

On the conception by the Chiefs of Staff of the future nature of war and the general principles for its conduct depend not only the future organization of the Services, within the limitations imposed by policing and occupational duties and the restrictions of peace economy, but also the design and production of equipment and the training of all the Services and all arms of the Service. We need a new F.S.R. Vol. III; a re-hash of the old one will not do. As a preface to the new one, I would print in full the quotation below, which is to be found on page 113 in Chapter V of the second volume of the best of all military histories, Winston Churchill's *Marlborough, His Life and Times*; and at the beginning and the end I would print in red capital letters the laconic comment of a Polish officer at the end of a tactical course in the Middle East: "There is only one sound principle of war—to be stronger than your enemy."

EPILOGUE

"Accounts of battles and campaigns almost invariably describe the *qualitative* character of the manœuvres without reference to their *quantitative* side. For instance, we read that this battle was won by turning the enemy's flank, and that by breaking his centre; that this army retreated because its line of supply was threatened; or that that advanced boldly, although its communications were cut, and in turn assailed those of its opponent. Where, then, is the secret of victory? It looks at first sight so simple to say 'turn the flank,' 'pierce the centre' or 'cut the communications.' But apparently none of these processes work by themselves. All are liable to be countered by other equally obvious and desirable movements. Thus the text-books on war too often merely show certain relations of the fronts and flanks of armies which have been as often favourable to one side as to the other. In truth, all these relations, though suggestive to a student, are meaningless apart from their *quantitative* data. Circumstances alone decide whether a correct conventional manœuvre is right or wrong. The circumstances include all the factors which are at work at the time: the numbers and quality of the troops and their morale, their weapons, their confidence in their leaders, the character of the country, the condition of the roads, time and the weather; and behind these the politics of their States, the special interests which each army has to guard, together with many other complications. And it is the true comprehension at any given moment of the dynamic sum of all these constantly shifting forces that constitutes military genius.

"The problem can seldom be calculated on paper alone, and never copied from examples of the past. Its highest solution must be evolved from the eye

and brain and soul of a single man, which from hour to hour are making subconsciously all the unweighable adjustments, no doubt with many errors, but with an ultimate practical accuracy. Thus while nothing is more easy than to assign reasons for success or failure by describing the movements, it is between more or less equal opponents impossible to reveal the real secret of either. That is why the campaigns of the greatest commanders often seem so simple that one wonders why the other fellow did not do as well. That is why critics can write so cogently, and yet successful performers are so rare. Almost any intelligent scribe can draw up a lucid and logical treatise full of laboriously ascertained facts and technical phrases on a particular war situation. But the great captains of history, as has been said, seem to move their armies about 'as easily as they ride their horses from place to place.' Nothing but genius, the dæmon in man, can answer the riddles of war, and genius, though it may be armed, cannot be acquired, either by reading or by experience. In default of genius nations have to make war as best they can, and since that quality is much rarer than the largest and purest diamonds, most wars are mainly tales of muddle. But when from time to time it flashes upon the scene, order and design with a sense almost of infallibility draw out from hazard and confusion. 'The mere aspirant after a type of character only shows his hopeless inferiority when the natural orator or fighter or lover comes along.'"

NOTE.—It would appear that much of what was dealt with in the pre-war Field Service Regulations, Vol. III, should be revised and incorporated in a Manual containing those principles and doctrines which are common to all three Services.—EDITOR.

THE WOMEN'S AUXILIARY AIR FORCE IN THE WAR

By Air Chief Commandant Lady R. E. Welsh, D.B.E., Director W.A.A.F.

IN common with the other Women's Services, the W.A.A.F. was not formed until a very short time before the War, for the W.R.A.F., formed in the latter half of 1914-1918, was disbanded on the declaration of peace, when it was decided to discontinue the employment of women in the peace-time forces. As a result of our recent experience we must indeed hope that the Service in peace will be represented in all its component parts and not again left in the unenviable position of having to create such a large and vital arm while waging a major war.

It is true that during the uneasy years before the War many of the women in this country, feeling war in the near future to be inevitable, pressed to be allowed to take some part in the country's war effort should the need arise. This pressure eventually became so strong that the Government could not but take notice of it, so preliminary discussions took place between the Service Departments and the various semi-military organizations in existence and it was agreed that one Women's Service should be created to provide personnel for both the Army and Royal Air Force. Thus it was the A.T.S. came into being after the Munich crisis in September, 1938. Shortly afterwards certain of its companies were labelled R.A.F., although recruited and trained under Army direction. This arrangement proved, perhaps not unnaturally, unsatisfactory; R.A.F. requirements differed widely from those of the Army, so the R.A.F. companies were dissolved and reformed on 28th June, 1939, as the W.A.A.F.

At the end of the following August, the W.A.A.F. consisted of forty-eight companies with a total establishment of 3,301 and a strength of 234 officers and 1,500 other ranks. The officers were for the supervision of the airwomen, there being at that time no idea of substituting them for R.A.F. officers. The airwomen were held in six trades—cooks, clerks, mess and kitchen orderlies, equipment assistants, M.T. drivers and fabric workers. Within four years from such modest beginnings the W.A.A.F. expanded, with the many and often acute growing pains natural to such rapid growth, to some 122,000 women, of whom 5,220 were officers. But while the machine creaked and groaned and the repercussions on individuals were sometimes unfortunate, it did the duty for which it was designed and the W.A.A.F. became in time an integral part of the R.A.F.

Once the companies were formed they were affiliated to squadrons of the Auxiliary Air Force, receiving training from the parent unit with the object of creating officer and N.C.O. producing units to form a cadre for rapid expansion when required. There was no intention at that time to call out the W.A.A.F. for duty until some months after the outbreak of war, but the need for women in certain trades to replace civilian staff called to the reserve, particularly teleprinter operators, clerks and domestic staff, was such that it was in fact called out on 28th August, 1939.

And so the W.A.A.F., with little training, with no tradition, no records, scanty guidance from an already harassed Air Ministry, with hardly an experienced officer or N.C.O. in its ranks, faced the task of building up a force great in numbers and in skill and fit to play its part within the R.A.F. What courage and determination its first Director must have needed when she undertook to face her formidable and overwhelming task!

On its inception every company in the country was at once besieged with thousands of eager applicants. Women of varying ages, social backgrounds, education and ability were enrolled, and very soon the number of recruits outran available accommodation (the supply of uniform was in any case negligible), so general recruiting was stopped in October, 1939.

To write of our early difficulties would be to cover many pages—the mistakes made through ignorance and lack of training, the confusion and, I must regretfully add, in some instances the prejudice so often to be found where the new and unusual is encountered; but always in the background of our uneasy and uphill path we could rely on the splendid and ungrudging help of individual members of the R.A.F., although themselves extremely busy and beset by their own difficulties. The point I would emphasize is that the W.A.A.F. started from nothing at the outbreak of war and expanded in the midst of war to 106 times its original strength in the space of four years.

When the first weeks of war, with their rush and pressure of work, had passed, the danger of taking large numbers of women into the Service too quickly was more fully appreciated. The R.A.F. itself was expanding very rapidly and there was little accommodation available on the stations for either men or women. Training facilities were neither planned nor adequate and very few women had a complete uniform. So during the first Winter of the War only personnel for the trades most urgently needed were recruited, notably clerks, special duties (or plotters) to replace men in the operations rooms on fighter stations and teleprinter operators to handle the rapidly increasing signals traffic.

In October, 1939, the first officers to be substituted for R.A.F. officers were trained in code and cypher duties and proved so successful that training continued and many more were appointed during the following twelve months. Yet even then general recruiting did not begin, and it must be admitted that there were numbers of R.A.F. officers at that time who viewed the prospect of a Women's Service in their midst unfavourably and did their utmost to prevent the posting of W.A.A.F. personnel to their stations. Some even maintained this attitude until 1942. Although such an attitude seems exceedingly strange to us now, I for one will not blame them; there is no doubt that the employment of women in the Service does create and increase administrative difficulties. However, once the first step was taken most of these troublesome gentlemen became enthusiastic about the W.A.A.F., and now that the time has come when we must concentrate our shrinking numbers they are resisting this with even greater determination; so, after all, we must have justified our existence and satisfied our critics.

The Battle of Britain put an end to any doubts there may have been, for it proved then without question that women could and would stand by their posts while under fire and so, by the end of 1940, the W.A.A.F. had proved its worth and recruiting went ahead through 1941, 1942 and 1943, restricted at first only by lack of accommodation and training facilities and later by Government direction of women into industry and the A.T.S. The W.A.A.F. was fortunately never short of recruits. From the beginning the great achievements of the R.A.F. during the Battle of Britain had invested it with a romantic appeal; the airwomen worked side by side with the airmen on stations which were the front line of the Royal Air Force; trades open to women were interesting and numerous; and lastly the uniform was becoming. It has always seemed strange to me that so many men failed to appreciate the very important part dress and colour play where the morale of women is concerned;

this was particularly noticeable when our women were first drafted overseas and put into khaki. They had been happy in their blue uniform and the change to khaki caused much dissatisfaction and brought forth a number of complaints which the supply of a blue dress would have prevented.

About the middle of 1943, the peak of the Service was reached and general releases began with those of the R.A.F. in June, 1945.

There is no space here to give a complete list of the trades in which airwomen eventually replaced airmen. They included such varied categories as the Medical Branches, the Wireless Operators, Photographers and Meteorologists, and numbered no less than eighty-three; moreover these airwomen were required to attain the same standard of technical proficiency as the airmen and they attended the same or similar courses.

Officer categories numbered twenty-two and embraced such widely different branches as catering, psychological selection, and intelligence. In 1941 and 1942, the number of officers required increased alarmingly; unfortunately there had been no training in advance of requirement and in consequence the careful selection and training of officers became exceedingly difficult when they were needed at such painfully short notice. To this day some of our officers and our tradeswomen N.C.O's have not received their full administrative training. By April, 1945, there were 6,077 officers, of whom 4,500 were held in direct substitution for male officers.

The ratio of officer substitution throughout was one for one, but for airwomen there were certain limitations; cooks were five to four, balloon operators twelve to eight airmen. In specified trades it was necessary to limit substitution to a certain percentage for varying reasons, usually the heavy nature of the work entailed or some other limiting factor which made a high rate of substitution difficult or uneconomical. Flight Mechanics, M.T. and Equipment are examples which speak for themselves; the number of men needed for combatant duties made it impossible to substitute above a certain percentage of the total number on any one station or throughout the Service.

The object of the W.A.A.F. was to effect where desirable the substitution of women for Air Force men in certain branches and trades, and this substitution started in the six trades already noted above, to which teleprinter operators were added on the eve of war and clerks special duties shortly afterwards, closely followed by a few airwomen specially selected for Radar duties. This latter trade afterwards expanded to over 4,000 Radar officers, operators and mechanics. Working in the closest secrecy, often in danger and under considerable strain, they proved conspicuously successful as operators of this country's air defence. Training in many other technical trades followed—Flight Mechanics, Fitters, Electricians, Radar and Wireless Mechanics: all trades which could not properly be called feminine, and yet in which the W.A.A.F. worked successfully. The clerical trades were, however, those in which they were outstanding, and before the War ended 41 per cent. of the clerical duties in the Royal Air Force, both accounts and general duties, were undertaken by W.A.A.F. personnel.

In the domestic trades also the percentage of substitution was high, indeed at times one felt that the replacement of men had gone too far in the large Air Force cook-houses, so hard and for such long hours did the cooks and cleaners work under exhausting and often unsatisfactory conditions. By the end of the War, 61 per cent. of the total number of cooks in the whole of the Royal Air Force were air-

women. No words of mine can express the regard I feel for them and the uncomplaining way in which they carried out their arduous and exacting duties. Unlike airwomen in other trades, they did not have the same share of operational excitement to sustain and keep alive their enthusiasm, but they kept it alive none the less. At first the extent of their contribution to the Service was not generally appreciated, but gradually the Service as a whole began to realize what we owe to the cooks.

The W.A.A.F., unlike the A.T.S., is not a Service complete in itself, running parallel with the parent Service. It was early realized that to serve the R.A.F. most successfully the W.A.A.F. must form an integral part of it. This does not mean, as many people tend to think, that the W.A.A.F. is run by the R.A.F. Every W.A.A.F. officer, from D.W.A.A.F. down to the most junior Unit Officer, although her function is to advise her Commanding Officer on all matters pertaining to the W.A.A.F., has also certain definite executive powers delegated to her, and she can use a purely W.A.A.F. channel of communication with the W.A.A.F. officer immediately superior to her or on the next higher formation, i.e., an additional channel parallel to the channel of communication normally used by the R.A.F. and W.A.A.F.

In fact the cardinal principles which have been accepted throughout as a basis for the administration for the W.A.A.F. are :—

(i) That the W.A.A.F. is an integral part of the R.A.F. and must be employed and administered as far as possible within the normal R.A.F. framework.

(ii) That W.A.A.F. personnel, when off duty, should be dealt with, as far as possible, by women.

(iii) That W.A.A.F. personnel, whether off duty or on, should be dealt with in all matters concerning their welfare as women by women. In matters of discipline they should be dealt with by women in the first instance.

The system of administration is flexible and adjustable to the changing conditions of war ; but the W.A.A.F. is always proud of the fact that it is so closely integrated with and so essential to its parent Service. Although constituted by Royal Warrant, the W.A.A.F. was at first virtually an amateur organization ; legally its members had only the status of camp followers. It says much for the women of those early days that there was so little trouble and so few cases of absence without leave or desertion, for the early days in the Service were grim indeed in many places. However, on 25th April, 1941, under the Defence (Women's Forces) Regulations, W.A.A.F. personnel were declared to be members of the Armed Forces of the Crown and became subject to certain sections of the Air Force Act.

There have been discussions on many occasions since the Defence Regulations were passed as to whether it would be more satisfactory to alter the legal status of the W.A.A.F. and to make all relevant sections of the Air Force Act applicable to it, but the regulations have remained substantially unchanged although it has been felt that such a step would be more logical in a closely integrated Service.

In every important R.A.F. operation of the war, W.A.A.F. personnel have played their part. The Dieppe raid. the North African landings, the great bomber offensive, D-Day operations and the re-entry into Europe, the flying bomb battle, and the final conquest of Germany, were all achieved with the help of W.A.A.F. officers and airwomen. Behind every operation they worked for long and trying hours, calmly and efficiently carrying out their duties.

Against this background, certain episodes stand out. From June, 1943, onwards a number of young W.A.A.F. officers were parachuted into France to assist in

organizing the resistance movement and to act as couriers and wireless operators. These women received the same training as the men employed on similar duties. They helped to organize sabotage with the Maquis, to make possible many supply-dropping operations and the destruction of enemy forces. The courage these young women displayed is an example which it would be hard indeed to equal; and some of them were never heard of again. The story of their exploits will ever remain a bright star in our W.A.A.F. history.

Mention should, I think, also be made of the few specially selected Code and Cypher officers who during the greater part of the War were made responsible for the cypher work of the War Cabinet. A special office was set up for them in 1942. They worked directly with the Defence Office, cyphering, duplicating and circulating most of the War Cabinet signals during the time of major military planning. The work was obviously most secret and I was proud to know it was being performed by members of the W.A.A.F. When the Prime Minister went to Marrakesh, Quebec and Yalta, a few of these officers accompanied him.

The W.A.A.F. have also played their part overseas; one may almost say with truth that they are serving all over the world. To begin with only officers were sent abroad, and in the Summer of 1940 the first three were posted for Code and Cypher duties to the British Air Commission in New York. They were joined a few months later by four more Cypher officers, and in 1941, twenty-seven additional Cypher officers were posted to the newly formed R.A.F. Delegation in Washington. So the postings went on until the number of W.A.A.F. officers in various parts of the United States reached about eighty and included Intelligence, Administration "G,"[1] P.I.,[2] Radar and Equipment, although the preponderant number always remained Code and Cypher. Officers were also posted to Canada and to a chain of stations down the East Coast of the North American Continent. Later, when operations began in the Pacific theatre, stations were also opened on the West Coast. Not all the stations on the chain were considered suitable for W.A.A.F. personnel and certain posting limitations were imposed. More than any officers sent overseas in the early years, I think those in America, far removed from the turmoil of war, experienced a nostalgic longing for their own harassed country fighting against such fearful odds.

In July, 1941, a small draft of Code and Cypher officers left on the long journey to Cairo, which had to be made in those days via Freetown, Lagos and the Nile and took many months. Further drafts followed, and the officers posted throughout the Mediterranean theatre followed the campaign along the North coast of Africa into Italy. The need for them was great and some were posted to Bari long before conditions in Italy could be considered suitable for women.

Early in 1943, it was decided to recruit women locally in Palestine, Syria and Egypt, and to assist in their training officers and N.C.O's were sent out from this country, but it was not decided until January, 1944, to draft volunteers to the Command in the Middle East. Although the trades required were few in number, there was no lack of eager volunteers and drafts continued to leave periodically throughout the next two years, until in January of this year some 3,600 W.A.A.F. personnel were serving in places as far apart as Aden, Cyprus, Italy, the Levant, Egypt, East and North Africa.

[1] General R.A.F. Administrative duties.
[2] Photographic Interpretation.

In 1944, after much discussion and subsequent careful planning, it was decided to send W.A.A.F. personnel to India and the Far East where they were urgently needed. The first draft left England for Delhi in October, 1944, to be followed by others, until in January of this year there were over 1,200 officers and airwomen in Delhi, Bombay, Ceylon and Singapore.

The first British women to land on the Continent after the re-entry into Western Europe were three W.A.A.F. nursing orderlies, who travelled to Normandy in an air ambulance on D-Day plus 7. Together with others they made many operational trips across the Channel, and thousands of injured troops who had never flown before were reassured by the presence of these young women in the aircraft. As soon as conditions permitted, further contingents of officers and airwomen proceeded to France, later moving into Belgium and Germany, where many of them are still serving.

Concern for the women serving overseas was very real. In the early days there were many difficulties and sometimes real hardships, but much has been done to smooth these away. Now a monthly report comes in from each Command overseas giving a full description of all arrangements made for the administration and care of W.A.A.F. personnel. I personally have visited 95 per cent. of the overseas sections so that their needs could be fully appreciated and realistically dealt with. The Inspector W.A.A.F. is also responsible for visiting sections, and other staff officers may be sent overseas to enquire into particular aspects of W.A.A.F. requirements such as equipment, education, etc.

The trooping of airwomen has been carefully supervised and however small the draft, since October, 1943, there has invariably been a competent officer to see the airwomen on board and inspect and report on accommodation; in addition a draft conducting officer accompanies and reports on each draft of any size, whether outward or homeward bound. It is gratifying that there have been few complaints.

Canada, Australia, New Zealand and South Africa have had their own W.A.A.F. working with their Air Forces, with whom we have kept in touch. Our common interests and difficulties have forged a very real bond between us. Two of our senior officers had the honour of helping the R.C.A.F. with the formation of the Women's Division of the R.C.A.F., many of whose officers and airwomen came over later on to serve with the R.C.A.F. on stations in this country.

The W.A.A.F. have also assisted several foreign Governments who wished to recruit and train their nationals in this country, in particular the Polish Government; and many hundreds of Polish women came into the W.A.A.F. and were trained in our depots.

And so the story draws to a close. In June, 1945, the release of married women began and now in May, 1946, more than half the women in the Service have been released. During the War, nearly a quarter of a million women have served in the W.A.A.F. Starting from nothing, an unknown quantity, regarded by many with apprehension, the W.A.A.F. became an indispensable and highly skilled force behind the striking power of the R.A.F. It has proved that women can not only carry out successfully many duties hitherto considered beyond their power and physical ability, but that they can also withstand enemy attack with calm and can live a communal life in harmony and with not a little humour.

FUELLING AT SEA

By Captain P. C. S. Tupper Carey, R.N.

FUELLING at sea has been carried out for many years, but remained for a long time in a state of arrested development. During the years between the wars we seem to have paid less attention to ocean warfare than to war in narrow seas. Operations which involved fuelling at sea were regarded as staff affairs which did not require, and certainly did not receive much practical attention. The endurance of warships remained pitifully low, but fuelling at sea was not made an everyday operation to offset this handicap.

The Japanese gave some thought to the subject: any scheme which took their fleet from Japan to attack Pearl Harbour would entail fuelling at sea, and no doubt some such scheme forced their hand. Much the same challenge was presented to the U.S. Navy, and they reacted strongly to it—more strongly, indeed, than the Japanese, as the U.S. Navy produced a new (for this generation) conception of sea warfare, based on adequate logistic support to keep their fleet operating in the forward area for months on end.

The British Eastern Fleet was presented with a similar challenge and met it as well as they could with the resources available. Their outlook was, moreover, bound up with that of the U.S. Fleet in the Pacific, and they followed the progress of fuelling at sea in that theatre with interest. The Eastern Fleet was, however, only a part of the Navy, the greater part being engaged in the far more serious challenge of the Battle of the Atlantic. Here it is of interest to note that the fuelling at sea of anti-submarine escorts by commercial tankers with Merchant Navy crews reached a high degree of efficiency and played an essential part in winning that battle. It was only when the War in Europe had been won that the Navy as a whole was able to take up the challenge of the War in the Pacific; and it was not until July, 1945, that logistic support for the British Fleet in those waters was really getting into its stride.

The War in the Pacific ended before fuelling at sea was fully developed, and it may be argued that with the appearance of the atomic bomb, rockets and suchlike weapons of sudden attack, the subject is of little more than historical interest. But the atomic bomb has not made navies obsolete; aircraft carriers will still form the core of any striking force. In time of strained relations it would be folly to keep a fleet at its bases, inviting another Pearl Harbour. The War in the Pacific has shown that a fleet can be kept at sea for long periods ready to strike when and where required. To our enemies this will be like playing chess against an opponent who has an invisible queen which appears at the crucial moment of the game in the best position. In war, the fleet should be able to strike at the enemy where it hurts most, and it must be able to strike for as long as possible—certainly for weeks, if not months, from bases which may be 2,000 miles or more away. Mobile or floating logistic support is the means by which this end can be attained, therefore fuelling at sea must be regarded as an everyday operation.

Logistic support on the material side is covered by "Supply." The old idea of supply was static—quantities of every sort of material kept in store at bases. The new idea of supply is dynamic, and embraces the whole organization for ordering, making, shipping and delivering stocks from the time that it is decided that an article will be required to the moment that it passes across a jackstay or through

a hose to the ship in the forward area ; in fact, a constant flow instead of periodical bulk demands.

Fuel is a vital part of the supply problem. The machinery which brings it into the forward area is simple when compared with that which supplies, say, air stores. The problems involved in the transfer of fuel at sea are almost identical with those that arise with ammunition and other stores. Before the war with Japan was won, fuelling at sea was being carried out at some distance from enemy bases, and at a much greater distance from our own. On no occasion were the Task Groups attacked during fuelling, nor was the fuelling force attacked while standing off and on in the fuelling area. It was therefore possible to fuel at low speed, but this inexplicable lack of aggressiveness on the part of the Japanese is unlikely to be followed by other navies in wars of the future.

The methods used to transfer the fuel were much the same in both British and U.S. Navies. By early 1945, preparations were in train to provide better fuelling arrangements at sea, and experiments in new hose rigs were being carried out.

More than one type of tanker is required to supply a striking force composed of fleet carriers, battleships, cruisers and destroyers with fuel at sea over long periods—say six months during strained relations and three months in time of war. During strained relations the main consideration will be to keep the fleet somewhere near enemy territory, but sufficiently far away to make discovery unlikely. In war it will be necessary for it to retire sufficiently far from the strike area to refuel without being molested. The replenishment area will have to be changed from time to time by considerable distances to give security. Even so, a fleet at sea will always be liable to air and submarine attack, and high speed is one of its safeguards. It must be possible, therefore, to fuel at high speeds, and large quantities of fuel will be required. Throughout the replenishing operation the fleet will be in a position of great tactical disadvantage. The overall time for replenishment will be determined by the rate at which fuel can be transferred, though there may be occasions, after heavy strikes, when the rate of transfer of ammunition will be the deciding factor ; but rapid fuelling is obviously essential.

Fast Tankers

For fuelling a fleet at sea, the commercial tanker is not suitable. Fast tankers are required, and they will need to be specially designed. They will be valuable ships, especially as it will be possible in peace time to build only the barely adequate number. The distance between the replenishment area and the base will be considerable, and it will be uneconomical for the fast fleet tankers to shuttle between these points. This duty will therefore have to be carried out by slower and less valuable vessels. Except during strikes the fast fleet tankers will cruise with the fleet ; and ships will fuel from them as occasion arises. When stocks get low the fast fleet tankers will part company and rendezvous with the shuttle tankers, fill up from them and rejoin the fleet.

None of these operations need take place in the same area. They will be subject to scales of attack varying in intensity according to the distance from enemy bases. The striking area will be closest to enemy country. Next will be the replenishment area ; the position of this will depend on the incidence of strikes, but it must be as far away from enemy bases as is compatible with the full development of the fleet's offensive. In rear of the replenishment area will be the refilling area, where the

fast fleet tankers meet the shuttle tankers and fill up from them. The further this area can be from enemy bases the better.

Fuel is supplied to the base direct from the oilfields or main bases in rear by bulk tankers. For this ordinary commercial tankers are suitable. Some form of cushion will be required at the base in the form of tankage either ashore or afloat to obtain a rapid turn round of the bulk tankers, as the shuttle tankers will not always be available.

There are four points at which fuel is handled and between which it is carried by three different types of tanker :—

1. The oilfields.
2. The base.
3. The refilling area.
4. The replenishment area.

(*a*) Bulk tankers.

(*b*) Shuttle tankers.

(*c*) Fast fleet tankers.

A fourth type of tanker—the small 1,300 to 2,000 ton harbour tanker, is also used at the base and should not be forgotten.

The specifications for these three types of tanker will vary, but one is common to all—the ability to fuel their escorts at sea. No radical increase in endurance of escorts seems likely in the future, in any case increase in fuel stowage is bound to be at the expense of other offensive qualities. The essential specifications are :—

Fast Fleet Tankers. Speed 22 knots ; cargo 15,000 tons—including aviation fuel. Delivery capacity—oil fuel 2,400 tons per hour, aviation fuel 250 tons per hour. To be capable of working in close tactical formation with the fleet and supplying fuel at sea when steaming at 20 knots for four ships simultaneously—two being destroyers astern.

Shuttle Tankers. Speed 18 knots ; cargo 15,000 tons, including aviation fuel. Delivery capacity—oil fuel, 1,500 tons per hour, aviation fuel, 250 tons per hour. To be capable of fuelling two ships simultaneously, abeam or astern at sea at 15 knots.

Bulk Tankers. Any commercial tanker.

The destroyers escorting the fleet during strikes steam further and at higher speeds than the forces they screen and in addition have a lower endurance. Battleships, carriers and cruisers must fuel their escorts at sea. Most escorts will require fuel at least twice during a long strike. The principle of never passing a pub. without going in for a drink is a sound one to apply in this case, and no opportunity of topping up should be missed. Battleships and fleet carriers should be fitted to fuel two destroyers at the same time ; light fleet carriers and cruisers one at a time.

Various methods of transferring fuel at sea have been used—none is thoroughly satisfactory and all suffer from being makeshift. Ships steam in close proximity to each other with hoses so rigged between them as to allow for alteration in station. Whatever method is used, the underlying principle is the elasticity of the hose rig. This is obtained at present by hanging the hose in bights in the air or trailing it in a bight in the sea. Two positions are used—abeam or astern. The " dry bight " is used abeam and the " wet bight " astern. Each position has certain advantages : personnel, mail, stores, etc., can be transferred easily in the abeam position but not astern ; on the other hand the position astern is tactically better because ships can break away in any direction and have comparatively clear arcs of fire. Though

fuel can be transferred at higher rates abeam, the tactical advantage of the position astern is a sufficient reason for retaining it for use when required.

The present rigs for fuelling abeam have proved adequate at the low ship speeds and low fuelling rates at which they have been used. It remains to be seen whether they will work at the higher speeds and rates which are required in the future. It is, however, certain that modification and simplification will be required. There are three rigs :—

1. The " ND " rig (latest British).
2. The Tandem Trough Rig (Pacific and Eastern Fleet).
3. The U.S.N. Rig.

These are all similar in principle. Troughs suspended from a derrick in the tanker are used to carry the hoses. The " ND " Rig made use of " Actaeon Net Defence " gear which became available at the end of the European War. The particularly long 70 foot derrick which can be topped and lowered without tending the guys is a feature of this rig. Although three troughs are used, only one of them is used for working the dry bight ; the other two keep the hose off the rails of the tanker and warship. The Tandem Trough and U.S.N. Rig are almost identical. Moderately long derricks are used, and two troughs provide two dry bights to give elasticity. With all three rigs ships can fuel up to 150 feet apart, but generally maintain closer station.

Fuelling astern the hoses are dragged through the water in a large bight, which allows for changes in station. At present a wire jackstay is lashed closely to the hose along its entire length and takes the strain of the bight, which is about 12 tons. It seems certain that a better type of hose can be designed and the jackstay dispensed with, which will be an improvement.

In neither the abeam nor the astern position is any tow rope or steadying line used. It has been found possible to keep station within the limits of elasticity of the hose rigs in quite bad weather. A marked distance line is used to show when the ships are opening or closing.

The 5-inch hoses in use at the present time in the Royal Navy are designed to float when filled with air and so facilitate connecting up with escorts for refuelling astern. This size was chosen because it was convenient and suited the purpose. The U.S. Navy use a 6-inch hose for fuelling abeam, as it is their commercial size. Neither of these sizes of hose are adequate for the higher rates which will be required, and it is probable that a 7-inch hose for oil fuel and a 4-inch hose for aviation fuel can be designed and produced which will be better all round articles than the present ones. With these the probable rate of fuelling will be :—oil fuel, 2,400 tons per hour using 7-inch hoses ; petrol, 250 tons per hour using 4-inch hoses. It should be possible to improve on these rates when fuelling abeam, due to the shorter length of hose.

Such greatly increased rates of supply will necessitate some alteration to ships' filling systems. This will be easily effected in new construction, but the fuelling organization in existing warships will have to be overhauled to deal with these rates. It will certainly be necessary to limit fuelling to about 85 per cent. of full stowage so as to keep the overall rate high.

Fuelling in the Pacific was often combined with the transfer of mails, supply of some stores and provisions, exchange and relief of ratings, casualties, etc. Some senior officers took the opportunity to visit ships under their command. Destroyers

from the screen were used as duty steam boats and had a busy time. A simple hemp jackstay and traveller with whips was used for transferring personnel and stores and worked successfully. So far as is known no one went " in the drink."

The supply of provisions and stores at sea from tankers was looked on more as a luxury than a necessity, due to lack of dry cargo space in the tankers. There is, however, a strong argument in favour of a proper supply of stores and provisions at sea. This opens up the possibility of the reduction in storage space in warships, space so saved being used for offensive purposes. Whether or not the tanker should carry stores as well as fuel is a matter bound up with the wider question of supply at sea generally.

There is no doubt that the War in the Pacific has presented us with new methods and new ideas on war at sea generally, of which the ability to fuel the fleet at high speeds on any course in almost any weather, is a part of the problem. It would be a tragedy if the advent of peacetime conditions produced an apathetic attitude to this subject. Fuelling at sea has not yet reached the stage of an everyday affair, such as coaling ship (in harbour) in the 1914-18 war, and until we have reached a similar pitch of efficiency we should not be satisfied with our efforts.

SELF-PROPELLED HIGH-ANGLE 12-PDR.
1926

30-TON INDEPENDENT TANK
1926

THE SHAPE OF THINGS TO COME

THE EARLY DAYS OF MECHANIZATION

By Major-General S. Capel Peck, C.B., D.S.O.

BETWEEN wars there is always a shortage of money available for the production of new equipment in the Army, and this necessitates a very gradual process of the re-equipment of units. The result is that the Army has to train for many years with the weapons with which they finished the last war. To the general public this may give the impression that new weapons are not being developed; in fact, progress is being made all the time in the fields of research and development.

The following article describes the progress made in the mechanization of the Army in the years immediately following the 1914–18 war, and deals in particular with the period 1918–33. It is designed to show, in fairness to those responsible for the equipment of the Army, how unjustifiable has been the criticism that there was little or no progress made in the development of armoured fighting vehicles during those years.

The broad picture is that during the inter-war period the tank was transformed from a lumbering, badly designed and badly equipped steel box with a maximum speed of 2½ miles an hour and a very short radius of action, to a vehicle primarily designed to fight with a speed of over 30 miles an hour, with efficient cross-country performance and with far easier maintenance. The armoured car was transformed from a purely road vehicle to one capable of moving across any country which was reasonably dry. An artillery tractor was developed in the form of a fast-moving tracked vehicle which carried the gun's crew and its ammunition and towed the gun. The infantry horsed transport was entirely replaced by light mechanized carriers.

Equally important was the transformation of military thought and training; speed and armour had to replace slow movement and vulnerability. The British Army started to train a mechanized brigade at a time when the armies of other nations were still training on the 1914–18 model.

It is first necessary to form a picture of the actual conditions prevailing at the end of 1918 so far as mechanization is concerned.[1]

Tanks.—The last design of tank to fight in France was known as the Mark V. It was simply an iron box on tracks, capable of an average speed of not more than 2½ miles an hour. Its armament consisted of two 6-pdr. guns with very restricted arcs of fire, one on each side of the tank, together with port-holes from which Hotchkiss rifles could be fired. The petrol tank was high up and when punctured leaked into the cab and frequently caught fire. The tracks were exceedingly crude and consisted of a series of plates joined together by hinge pins. They only lasted from 150 to 200 miles, while the sprockets which actuated them lasted not more than 50 miles.

In spite of the above disadvantages this tank, according to German experts, won the war of 1914–18.

Wheeled Vehicles.—Most armoured cars and all transport vehicles ran on solid tyres and had no cross-country capacity whatever.

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[1] It must be remembered: (1) that at this time the knowledge of tracked vehicles was extremely sketchy and was far removed from an exact science; (2) that with the exception of a few slow-moving tractors no commercial use was made of such vehicles; and (3) that none of the armament firms had departments for production of armoured fighting vehicles.

Tractors.—These were used for heavy guns only and took the form of either Holt tractors on tracks or four-wheel-drive tractors. It is interesting to note that these tractors were American, as were all the other most successful 3-ton lorries, such as Peerless, Packard and Pierce-Arrow.

Such then was the state of development of tanks and mechanized vehicles at the end of the 1914–18 war. The steps taken up to 1933 to improve the design of all these machines in order to bring them into line with the requirements of the Army for any future war will now be examined.

It was clear to the military branches of the War Office that in order to tackle this problem with success a period of intense research and development was necessary. This was undertaken within the limits of the extreme financial stringency laid down by the Government.

Such research and development was applied to tactical as well as technical considerations. With this end in view the General Staff studied and experimented with the different types of formations and organizations necessitated by the increased speed of, and greater protection afforded by, the modern armoured fighting vehicles, which were continuously improving in their efficiency.

At the same time they were training the future Army to use these new types of assault weapons in the attack and also in defence against similar weapons. As a result of this a Service Manual was issued in 1931 containing instructions for the organization, armament and operational handling of mechanized forces. This manual was at the disposal of all officers of the Army.

During the next ten years a new organization was brought into being by which the Master-General of the Ordnance was made responsible to the Army Council for the design and development of all armoured fighting vehicles as well as all other military mechanized vehicles, and a new Directorate under a Director of Mechanization was formed to take over the detailed duties involved. An era of intense experimental work commenced.

In order to assist in this matter new committees and establishments were formed of which the following were the principal :—

C.I.G.S.'s Committee.—The C.I.G.S. himself presided over this. The members of it consisted of the General Staff Directors together with the Master-General of the Ordnance and his Directors.

The object of this Committee was two-fold : (*a*) to enable the General Staff to lay down the requirements in armaments of all types, and discuss them round the table with the technical officers concerned ; (*b*) that the M.G.O. could point out possible lines of approach to new equipments through the researches, inventions and scientific achievements which were constantly being brought to his notice from his own establishments or from outside sources.

The decisions of this Committee formed the basis of the M.G.O.'s design and experiments.

Mechanical Warfare Board.—This Board was presided over by the M.G.O. Its members were of two types : (*a*) military officers, chiefly technical, drawn from all branches of the Army, who provided the " user knowledge " and experience required ; and (*b*) civilian members nominated by all the important engineering institutions in England. It provided direct liaison with the most advanced thought and accomplishments in mechanization in the civilian engineering and transport world. Its

duty therefore was to advise on all technical problems and to put forward new suggestions with regard to mechanization. It worked through a technical sub-committee, the members of which were specially chosen highly-trained technical officers who, in turn, called on and formed sub-committees with the civilian experts for guidance and advice. The records of their recommendations were printed and filed.

Mechanical Warfare Experimental Establishment.—This was started at Farnborough from a handful of officers, N.C.Os. and men and grew until it became the most important, efficient and reliable experimental establishment for the testing of all mechanized vehicles, including tanks, in Europe, if not the world. All prototypes were tested and run to destruction under the most careful supervision of highly-trained technical officers with "user knowledge."

In 1931 a branch of this establishment was opened at Cairo in order to ascertain how such machines which had passed successfully through the tests at Farnborough stood up to tropical conditions of climate and terrain.

As an instance of the work carried out by this establishment, it is interesting to note that a convoy from it made the cross-country journey over desert country from Cairo to Kenya and back, without outside assistance, as early as 1932 and gained knowledge and information of outstanding value to design. It also made another journey the following year to Kordofan. It was a disastrous mistake when this branch in Cairo was disbanded. Had it continued to function until 1939 the designs of tanks, A.F.Vs. and lorries might have been so much more in accordance with what the conditions required that they would have affected the whole war in Northern Africa.

A course over the roads and hills of North Wales was carefully surveyed and used to test vehicles of all types. The gradients of this course were as nearly comparable to those of the Indian Frontier as could be found in this country and served a very useful and necessary adjunct to the establishment at Farnborough.

Besides the above committees and establishments, departments for design and inspection of all tanks and armoured fighting vehicles were established. The officers required to man the above establishments were chiefly trained by the engineering staff of the Military College of Science, where a special branch was formed to deal with the technical side of mechanization. The progress made under this new organization will now be discussed in some detail.

TANKS

At the end of 1918 there was an outcry for increased speed, and it was quite evident for this reason and because of its short life that the type of track then in use and its suspension must be scrapped. It must be emphasized here again that at this time the science of track propulsion was in its infancy, very little being known about it. Several attempts had been made to spring the tracks but they had all proved abortive, and it was not until 1922 that the first satisfactory sprung track was produced and tested, first on a purely experimental machine and then on the Medium Tank Mark I.

Medium Tank Marks I and II

This tank was the beginning of a new era and was a revolution in tank design. The track was sprung successfully; but although this springing increased the life of the track very considerably and enabled the speed of the tank to be greatly increased, there was still plenty of room for improvement, and the final form of this tank, known as the Medium Tank Mark II, showed the following characteristics :—

Weight	... ...	10½ tons.
Speed ...	... ...	15 m.p.h.
Protection	... ...	6–8 mm.
Engine	... ...	80 h.p. air-cooled.
Armament	... ...	3-pdr.
		4 Hotchkiss machine guns.
		2 Vickers machine guns.

(*N.B.*—It is interesting to note that some of the most modern American tanks had air-cooled engines.)

The 3-pdr. gun was in a turret with an all-round traverse—a great advance on the 1918 tanks. In much later types it was changed to a 2-pdr.

The tracks were made up of stamped plates which added greatly to their life, and lasted 1,000 miles, and this at the greatly increased speed of 15 m.p.h. The driver was placed well forward and the increased visibility was of the greatest assistance to him.

Independent Tank—1926

The experience gained from Medium Tank Mark II enabled those responsible to launch out into new ideas, greater speed, greater firing power and greater protection. Thus, what was known as the " Independent Tank " was produced. This was a great advance on any other tank in the World and was produced as a result of the organization mentioned above, together with Messrs. Vickers. Its chief points of interest were :—

Weight	...	30 tons.
Speed ...	...	20 m.p.h.
Protection	...	Up to 1-in. thickness.
Engine	...	350 h.p. air-cooled.
Armament	...	One 3-pdr. in a central turret capable of all-round fire, co-axially mounted with a ·303 machine gun.

(*N.B.*—By this construction it was possible for the chief gunner to fire either one or the other of these guns. This was a complete innovation in gunnery and was evolved in the Design Department of the Royal Arsenal.)

There were also four other machine guns each in its own turret placed at equal intervals round the main turret. One of these guns was capable of anti-aircraft fire. This was also an innovation.

The track was of the stamped type and proved of great durability in spite of the increased speed. The controls were hydraulic and so it was possible to steer this tank with a wheel, like a motor-car, although it weighed 30 tons, at 20 miles per hour. The visibility was excellent, as the driver was placed very far forward. The fighting chamber was cooled by an electric fan and the engine was separated from the fighting compartment by a bulkhead. A cupola was provided for the commander for observation purposes from which he was able to communicate with the driver and each of the gunners by laryngaphone—another advance.

One of the great anxieties of the designers of this tank was the braking system. No maker of brake linings was able to guarantee that their linings would stand up to the requirements of the tank, and special testing machines had to be designed to solve the problem. The design of this tank was a very great advance on anything which had preceded it and there is clear evidence that the Japanese were copying it when the 1939–45 war broke out.

16-ton Tank—1928

It was decided now, owing to the impossibility from the financial standpoint of producing the 30-ton tank in quantities, to keep it as a prototype of a heavy tank and proceed with the design of a smaller and faster edition of it but including all its good points and the lessons learnt from it. Thus was evolved the 16-ton tank, whose chief characteristics were as follows:—

Weight	...	16 tons.
Speed ...	...	30 m.p.h.
Protection	...	8 mm. to 14 mm.
Engine	...	180 h.p. air-cooled.
Armament	...	Was in three turrets—the main control one contained a 3-pdr. and a ·303 Vickers machine gun co-axially mounted. The two smaller turrets each contained two ·303 machine guns mounted in pairs capable of being fired by one man and simultaneously.

It was possible therefore to fire over a wide arc five machine guns or one 3-pdr. and four machine guns.

This tank proved to be a very steady gun platform compared with any previous type. The importance of this cannot be overstressed. It has done 30 miles per hour and easily did 25. It climbed a slope much more easily than previous tanks because it was the first tank to be provided with its centre of gravity placed far enough forward. The engine and transmission were placed in a compartment by themselves, thus ensuring a cool atmosphere in the fighting compartment and enabling the engine or parts of the transmission to be more easily removed.

Many new ideas were tried out in this tank, such as a Pyrene fire extinguisher system and also anti-gas proofing and various kinds of transmission and steering. It was in fact far ahead of all previous types.

Light Tanks

About 1927 a revolution occurred in ideas for tanks; in other words there was an outcry for very light tanks, that is one, two or three-men tanks, with high speed and good cross-country capacity.

Several models were designed and tested, but the most successful one eventually became known as the "Carden-Loyd" after the names of the inventors. It was extremely crude, but it had two very great recommendations: it was very inconspicuous and the tracks were extremely cheap. It employed a Ford engine. Unfortunately the inventors had had no "user knowledge" and therefore had not realized many of its weaknesses. For instance, the driver sat with one leg on each side of the engine and, if he was wise, wore asbestos trousers. He had a pedal for each foot by which he steered the machine by braking the tracks. The gears were operated by a joy stick as in an aeroplane.

The tracks consisted of lengths of conveyor chain. There was no articulation, no springing and no rollers for the track, which was ordinary conveyor chain. Its life was only about twenty miles. This machine could answer no purpose as it stood but showed great imagination and originality of design and had achieved inconspicuousness to a high degree, using a track costing only ninepence per foot and an engine which was in production. The War Office bought it for £100. (*N.B.*—It is understood that the royalties lately derived from the development of this prototype in a single year amounted to close on £500,000.)

The development of this track was an excellent example of non-stop evolution. Eight different types, gradually improving, were evolved by the close collaboration between the War Office and the inventor. They were tried out to destruction during the next two years and finished up with the " short pitch " track on the machine-gun carrier. The machine-gun carrier subsequently developed into the Bren-gun carrier which also employed the " short pitch " track and was universally acknowledged to be one of the most successful machines of the late war.[1]

The track assembly was also used to replace wheels on the ·8-in. " Oerlikon " gun used for both anti-tank and anti-aircraft purposes. This gave it great inconspicuousness and also a much greater cross-country capacity. The type of track made possible the light tanks of 1930. The principle of it has since been adopted by almost all the tracks on modern tanks.

Light Tank

The Light Tank, weighing about three tons and having a 60 h.p. engine and a much improved suspension, actually reached a maximum speed of over 40 m.p.h. and an average of 30 m.p.h. for a run of over 90 miles between Farnborough and Wool.

The armament of these tanks were either ·303 or ·5-in. machine guns. The design was based on the principle of unit replacement ; that is, the engine could be lifted out and replaced or the transmission uncoupled and lifted out. The chassis of the Light Tank was used as the basis of a Light Dragon for field artillery as stated below. It was used for other purposes also, such as a carrier for light anti-aircraft guns which could also be used for anti-tank purposes.

Swimming Tank

As early as 1930 it was clear that if some arrangements could be made by which tanks could cross rivers without having to wait for bridges to be erected it would be a very great advantage. This problem was tackled in two ways :

(1) By constructing tanks which floated by reason of their own buoyancy. Such tanks were designed and produced by Vickers. They had propellers at the rear which worked from the main engine of the tank. It was, however, found that their armour was necessarily so thin as to make them useless against any kind of gunfire.

(2) By means of floats attached to each side of the tank. These floats were collapsible and very easily detachable. They were connected together by a framework which was propelled by an outboard motor. The idea was that after the tank had crossed the water the framework with the floats returned for another. These floats were to be carried packed on light six-wheelers.

Light tanks provided with these floats were launched from a ship by the Royal Navy at Spithead and behaved well, and in 1932 several were launched from a ship in the middle of Lulworth Cove and swam to shore.

These Swimming Tanks were the forerunners of those used on D-day and were constructed from the designs of the same inventor—N. Straussler.

[1] The Bren gun was developed at this period in the Department of the Director of Mechanization.

ARMOURED CARS

The armoured cars used in the 1914–18 war were mostly with solid tyres, with the exception of a few Rolls-Royce cars on pneumatic tyres which were sent to Egypt.

It was considered after that war to be most desirable that armoured cars should be given a cross-country capacity, better protection and improved armament, and so the Lanchester armoured car on a six-wheel chassis was evolved. This type of chassis had been developed in this country by the War Office and by the encouragement it gave to private firms to do so by means of a subsidy scheme.

The Lanchester was armed with one ·5-in. machine gun and two ·303-in. machine guns. It had quite a good cross-country capacity and an excellent one on the road, reaching the speed of 45 m.p.h., and was very silent. It proved extremely useful. Later a similar armoured car on a commercial light six-wheeler chassis was produced and formed part of the armed equipment of the Army.

ARTILLERY MECHANIZATION

After it became clear that the light draught-horse would no longer be used for buses and general transport work and was, therefore, not being bred either in England or the Dominions in any quantity, it became necessary to mechanize the Artillery even if this did not turn out to be more efficient.

The three following methods of doing this were considered and experimented with :—

(*a*) Self-propelled artillery.
(*b*) Tractor-drawn artillery.
(*c*) Artillery porteé.

Of these three methods, it was easily demonstrated that (*a*) was the most efficient but also the most expensive and (*c*) the least efficient.

Self-propelled artillery.—As early as 1926 a battery of 18-pdr. guns, the most efficient field gun of the 1914–18 war, mounted on a medium tank chassis, was produced. The gun had an all-round arc of fire and as good a cross-country capacity as a tank and proved a very formidable though expensive weapon. These guns were also capable of anti-aircraft fire. They had a speed of 15 m.p.h.

Tractor-drawn Artillery

Experiments were made to ascertain which of the three following types of tractors was the most suitable: fully-tracked tractors; half-tracked tractors; wheeled tractors.

As a result of experiments and experience generally, it was clearly established that the fully-tracked tractors known as *Dragons* were far and away the most efficient and were indeed necessary in a country where mud had to be contended with, and that the purely wheeled tractor was the least effective.

Dragons.—The design of these was based on the chassis of the Medium Tank but with a body designed to carry the crew and 70 rounds of 18-pdr. ammunition. They had the same 80 h.p. air-cooled engine as the tank and had a speed of 15 m.p.h. This maximum speed, however, was too high for the wooden wheels of the guns which broke up under the strain. (*N.B.*—This was of course before the days of pneumatic-tyred guns.) These *Dragons* were therefore issued to 60-pdr. and 6-in. howitzer batteries, and as such were entirely successful. Similar *Dragons*, but of a smaller

type, were then produced from the chassis of the Light Tank and proved most efficient for use of horse and field artillery. They were fast enough across country for employment with the cavalry and could easily do 100 miles a day.

Half-tracked tractors.—Two types of these were experimented with, and both of them were based on the design of the chassis of the light six-wheeler, the rear wheels of which had been replaced by a track assembly. The tracks were either rubber or steel. The rubber-tracked machines were of French design and were very extensively used in the French Army. In their initial form, they employed a friction drive and were not entirely satisfactory; but at the suggestion of the War Office they were eventually fitted with a positive drive, when their efficiency became of a high order. The steel-tracked machines of the Johnson type were of course British, and did equally good work.

Both these types gave a good cross-country performance, which was not so good as the fully-tracked tractors but definitely better than the wheeled tractors.

Wheeled tractors.—After severe tests it was considered that this type of tractor was not able to give a sufficiently high degree of efficiency to be adopted for artillery which had to cross rough and muddy country, but it was good enough for heavy artillery which was confined chiefly to the roads. Several different types of four-wheel-drive tractors were tested out, e.g., " Hathi " and the " Pavesi " (Italian).

Artillery porteé.—In this system—much used in France—the 18-pdr. gun, together with a smaller agricultural tractor, was carried in a lorry. The gun and tractor were dismounted from the lorry and the gun taken into action by the tractor on arrival near the proposed site of the battery. This system was not considered a success in the British Army..

WHEEL-CUM-TRACK

Tracks have far greater cross-country capacity than wheels, as stated above, and although in some cases their life had been increased to as much as 1,500 to 3,000 miles, this still fell short of the life of tyres. An attempt was therefore made to combine the two systems in one machine. Such machines used wheels on the road and tracks across country. Both light and medium tanks, as well as armoured cars, were designed on these lines, but proved so very cumbersome, expensive and heavy that none were produced after the prototypes.

WHEELED VEHICLES

As previously stated, the British Army in 1918 was equipped with the solid tyred 3-ton lorry as its major form of mechanized transport, and of these types the best were all of American origin, such as Peerless, Packard and Pierce-Arrow. It was the Army who first insisted in this country upon the use of pneumatic tyres on load-carrying vehicles and encouraged their development in commerce by a subsidy scheme applied primarily to six-wheelers.

Experiments were made to ascertain the relative values of multi-wheel and multi-drive vehicles, e.g. (*a*) two-wheel drive; (*b*) four-wheel drive; (*c*) six-wheel drive; (*d*) eight-wheel drive; and to determine their uses for particular purposes.

Many different types of special vehicles were designed and brought to production during the period which is now being considered, such as :—

(1) Heavy A.A. gun trailers on pneumatic tyres together with the six-wheel-drive A.A. tractors.

(2) The mobile searchlight vehicle on six-wheeled pneumatic tyred chassis with a power take-off to drive the electric generators.

(3) Vehicles for mobile radio.

(4) In 1932 a prototype of a tank transporter was produced. It was capable of carrying 20 tons on pneumatic tyres, winching a derelict tank on to its own platform by its own engine power. All more recent tank transporters have been evolved from this prototype. Without such transporters the long marches in the recent war by the armoured divisions would have been impossible. Their great importance has been stressed by Field-Marshal Montgomery.

Intensive research and development were carried out in the following amongst many other directions, many of which were applicable to A.F.Vs. as well as to lorries :—

(*a*) Mobile workshops, laboratories, offices, etc.

(*b*) Electrical screening of engines to avoid signal interference.

(*c*) The development of pneumatic tyres of all types and sizes including both low and high pressure with special treads for desert work.

(*d*) Bullet-proof tyres which were used on armoured cars.

(*e*) Special radiators for tropical cooling without which no vehicle could have operated in the desert.

(*f*) Air filters for tropical and desert conditions, without which the life of engines in desert countries would have been measurable in weeks only.

(*g*) Continuous attempts were made to produce heavy oil engines suitable for tanks. Mr. Ricardo's services were retained for this purpose and he produced most promising prototypes.

Many other designs and inventions were studied, experimented with and finally brought to production for the 1939–45 war, but enough has been said to show the degree of progress which was made during the years covered by this article.

In fact, there can be no doubt that at the end of the period under review this country was well ahead of all other countries in the World in the design of armoured fighting vehicles. This was freely accepted in America where the Chief of the U.S.A. Ordnance Department reported :—

" We are nothing like so far advanced in the matter of tanks as the British ; they have been at it longer, spent more money and made more progress than anybody else. No other country has developed tanks of such range and speed."

THE FUTURE OF ARMOUR AS THE ARM OF MOBILITY

By Major A. J. Wilson, M.C., The Rifle Brigade

ANY paper on a military subject written at the present moment is necessarily coloured and affected by the views of the writer on nuclear energy as applied to land warfare. To leave this factor out of account in considering any current military problem is to play Hamlet without the Prince with a vengeance, and leads inevitably to the formulation of false ideas and conclusions. This paper, then, is based on the thesis that nuclear warfare between any two Powers or groups of Powers in the world will not be a practical proposition for the next ten years. Only one Power—the U.S.A., is in full possession both of the scientific secrets and of the necessary industrial potential and apparatus for the conversion of nuclear energy to war purposes, and it is furthermore doubtful whether any Power would consider it either expedient or wise to launch a nuclear *blitzkrieg* without warning on an adversary Power, both because of the fear of reprisals and because of the disastrous effect such an assault would have on the conscience of the civilized world. It can therefore with a reasonable degree of security be assumed that nuclear warfare on the lines envisaged by General Tuker in "Nuclear Energy and War"[1] will not develop at the start of a war within the next ten years.

Leaving a nuclear *blitzkrieg* temporarily at any rate out of account, we must now consider the probable pattern of the early stages of any future world war. The pattern of war throughout the ages shows that one war has nearly always begun where its predecessor left off; periods of peace between wars are seldom marked by any very novel tactical or strategical conceptions. For example, the pattern of the early stages of the 1914-18 war was far more akin to the Franco-Prussian war than to its final stages in 1918, while the similarity of the first months of the 1939-45 war in the West to the trench warfare of 1914-18 is even more marked. At the same time there was singularly little resemblance between Maginot warfare in 1939 and the patterns of the battle of Normandy and the Rhine crossing in 1944-45.

It is therefore reasonable to deduce that any future land conflict during the next ten years between major Powers is likely to develop at first along the lines of present day warfare, always assuming that nuclear warfare be avoided at the start of the war for the reasons already outlined. This is not to deny that there may be minor changes, but these are likely to be matters of degree only; the basic pattern and tempo are likely at first to be approximately the same.

Particularly up to the end of the Tunisian campaign, and to a slightly less degree afterwards, armoured forces were without doubt the dominant arm on land during the 1939-45 war. The German onslaught on Poland, the collapse of France, the German victories in Russia in 1941—all these were due in the last resort to the power of armoured forces. Warfare in the Western Desert and in Tunisia mainly also followed this trend, though towards the end of the period the dominance of armour on both sides was greatly reduced by the improvement in the calibre and performance of anti-tank weapons. Nevertheless the dominance of armour was reflected in the concentration with which commanders at all levels studied their tank "runner" states, and it became second nature to base a plan on the quantity and

[1] January, 1945, number of the United Service Institution of India Journal: "Nuclear Energy and War," by Major-General F. I. S. Tuker, C.B., D.S.O., O.B.E.

quality of armour available on either side. Infantry were reduced at least in their own minds if not in those of their commanders to the status of " tank followers," and were relegated to the roles of holders of a firm base and " moppers up " of pockets of resistance which had been by-passed or otherwise neglected by the all-dominant armour.

The Battle of Alamein and the stiff, dour fighting of the Tunisian campaign did much to redress the balance, which in Italy during the Winter campaigns of 1943-44 and 1944-45 even became tilted towards infantry as the dominant arm. Nevertheless, as soon as the sun shone and the mud of the Winter and early Spring developed into the dust of early Summer, it was to armour that commanders, whether in Western Europe or in the Mediterranean theatre, looked for their decisive successes. The advances in Italy from Cassino to Florence (1944) and the Senio to the Alps (1945) were both predominantly armoured operations after an initial infantry dogfight, while in France and Germany the pursuits from Falaise to the Seine and Scheldt and from the Rhine to the surrender on Luneburg Heath were equally operations in which armoured formations played the leading role. It is thus evident that armour was the dominant arm on land during the late war, even if many of its successes could not have been achieved without a previous victory in the infantry battle.

To what factor did armour primarily owe its prominent role in the war just concluded? A glance at the history and development of war, however cursory, makes this abundantly clear. During the war of 1939-45 armoured forces constituted the arm of mobility, which whether represented by the elephants of the Carthaginians, the knights of the Middle Ages, the cavalry of Prince Rupert and Cromwell in the XVII Century or the light brigades of the Peninsular War, has always held the centre of the military stage. The only exception to this tendency occurred on the Western Front during the 1914-18 war, when tactical and strategical conceptions on both sides for a variety of reasons reached a very low level. The later stages of the Palestine campaign showed that the apparent exception in the West to the law of the dominance of the arm of mobility was only occasioned by a surprising lack of military understanding, and the trench warfare of 1914-18 can therefore be interpreted not as an exception to a law of history but as the logical outcome of a lack of tactical and strategical insight on the part of the commanders on both sides of " No Man's Land."

Armour, then, owes its dominant position during the 1939-45 war to the fact that it has throughout constituted the arm of mobility. We must now consider how far it is likely in the future to retain this position of dominance. The recent war shows the gradual conquest of the tank by the anti-tank weapon. Brigadier Carver's article " Tank and Anti-Tank "[2] makes it clear that latterly even the heaviest tank was unable to advance in face of an anti-tank screen unless preceded by an air or artillery barrage on the lines of 1914-18. Furthermore the well trained and determined infantryman with his bazooka in close country was able to halt a tank attack, unless the latter was well supported and accompanied by infantry. The contrast between the standard organizations of the British armoured division of 1941 (two armoured brigades, one infantry battalion) and the 6th British Armoured Division in Italy, 1944-45 (one armoured brigade, two infantry brigades) shows the decline of the power of the tank. It is in fact almost true to say that, except against

[2] " Tank and Anti-Tank " by Brigadier R. M. P. Carver, C.B.E., D.S.O., R.U.S.I. Journal, February, 1946.

disorganized opposition which has already been defeated in the infantry battle, the tank is now no longer a " matchwinner " but has been reduced to the status of a supporting arm.

If, however, armoured formations are incapable of assaulting prepared positions owing to the dominance of the well sited and dug-in anti-tank gun, they remain the masters of the towed anti-tank weapon in open warfare, while with the assistance in similar conditions of infantry trained to work in conjunction with tanks they can deal also with self-propelled anti-tank guns. The continued dominance of armoured formations in these circumstances is well exemplified by the operations of the B.L.A. armoured formations beyond the Rhine and by the decisive part played in the destruction of the German armies in Italy South of the Po by the 6th British Armoured Division. It should be noted, however, that in both cases the opposition had previously been routed in the infantry battle, and in neither case had the support of an air arm which was capable of giving the Allied air forces opposed to it any great anxiety.

Armour, therefore, having been the dominant arm on land throughout the 1939-45 war, was rapidly losing its position towards the end (largely as a result of its mobility, to which it had previously owed its dominance, being restricted by the development of the anti-tank gun and the infantry anti-tank weapon). It still retained its dominance when operations became fluid ; but, before this state of affairs could develop, special conditions were required, e.g., a perpetually open flank (as in the Western Desert) or an enemy previously defeated in the infantry battle (as after the crossing of the Rhine or the Senio). By the end of the War, in fact, armour was only the arm of mobility in the presence of certain special conditions, whether naturally prevailing or artificially obtained.

Let us now consider how these special conditions of fluid warfare can be obtained in the future, other than by victory in an infantry slogging match as at Alamein or in the Liri Valley in May, 1944. Victory, under these conditions already expensive, becomes a disastrous luxury as soon as the casualties reach the scale of similar operations during the 1914-18 war. During the later stages of the 1939-45 war the skill of our commanders and our overwhelming material superiority combined to keep our losses in this type of operation within bounds, but we must be prepared in any future conflict in which there is approximate material equality between the two sides for the pendulum to swing towards the defender and for casualties in a direct assault to become once again prohibitive. The problem of opening up the battle other than by success in an infantry dogfight, though not immediately pressing, is likely to become so in any future war where there is approximate material equality between the contestants.

The answer to this problem surely lies in the further development of transport aircraft. The effect of the giant strides already achieved during the past six years in the development of aircraft for this purpose can be clearly seen in the contrast in tempo between the deployment of the five divisions of the B.E.F. in 1939 and the switch by air of the 5th Indian Division from the Arakan to the Imphal front in the 1944 Burma campaign. Air transport is still in the early stages of its development, but the advances already made show clearly its potentialities as regards both the tactical and the strategical aspects of war.

It is at present true to say that airborne forces are only suited for tactical roles because of the limited weight and bulk of equipment which can be carried by air. Arnhem showed that airborne troops are capable only of very limited advances

after reaching the ground, and that they are dependent for holding their objective on the speedy arrival of " follow up " ground troops. Throughout the late war it was in the last resort on the arrival or non-arrival of these " follow up " troops that the success or failure of an airborne operation depended. The success of the German operations in Crete in 1941 constituted the exception which proves the rule, for the defenders in addition to being almost entirely without air support were also wholly lacking in armour. It is therefore on future advances in the deployment of these " follow up " troops that will depend the ability of airborne forces to assume with success a strategical role.

It can reasonably be assumed that the development of transport aircraft will provide in any future war for the movement by air of the troops following up an airborne operation. It is further assumed for the purposes of this paper that it will be a practical proposition to fly by transport aircraft tanks of at least the calibre and armament of a Sherman.

What then will be the pattern of the airborne operation of the future ? The first phase is unlikely to differ greatly, save in degree, from the present ; parachute troops being employed as during the late war with the full support of all available fighter and bomber aircraft. The principal difference will probably be found in the location of the zone in which parachute troops are dropped ; for, owing to the " follow up " troops and supplies being flown in, it will be possible to drop the first flight very much deeper than at present and consequently on strategical as opposed to tactical lines. The dropping zone of the paratroops must however at all costs include an airfield, and air strip construction parties with their equipment must land at an early stage in order to construct new fields to take the great volume of air transport traffic that will follow.

In the second phase airborne " follow up " troops will arrive by transport aircraft on the airfields which have been seized or constructed by the first flight. The second flight will include elements of an airborne armoured division which will sally forth from the firm base held by the airborne infantry of the first flight to operate against the open flank or lines of communication of the opposing army. Their main task at this stage will be the seizing and holding of further airfields or ground suitable for development as air strips in order to speed the deployment of further airborne " follow up " troops. The build-up during this period will follow the main lines of the development of a beachhead in any other combined operation, and a period of apparent stagnation as at Anzio and in Normandy may even supervene, though this would be both dangerous and undesirable.

In the third phase the airborne army will operate in conjunction with the ground " follow up " troops in an effort to " besiege " the enemy army on the battlefield. This has now been the ultimate object of commanders on land for over two thousand years and would be in pattern an operation no different from other land battles of the past.

This then is the pattern into which the airborne armoured forces of the future will have to fit if armour is to retain its position as the arm of mobility and consequently as the dominant arm on land. It is not within the scope of this paper to discuss in detail how these forces should be constituted in order to play their full part in this pattern, but the following very general considerations may possibly be of interest.

In the first place the armoured division as a formation should remain, if only

because of its value in producing team-work, co-operation between all arms, and a high standard of combined infantry and tank training. Two infantry brigades will be required—possibly one a motor brigade, mounted in light armoured wheeled or half-tracked troop carriers, for working closely with the tanks in really fluid operations, the other a normal infantry brigade for restoring mobility to the armour in the face of more organized opposition. Whatever the establishment of infantry, sufficient Kangaroos to transport at least one battalion of infantry should be maintained as a divisional pool. The proportion of supporting arms will depend on the availability and lifting power of the transport aircraft and for this reason it is not proposed to go into the detail of the remainder of the organization. The guiding principle would be to retain as much of the frame-work of a normal armoured division as possible having regard to the limitations imposed by the nature of the transport aircraft employed. It may be argued that this organization would be unduly cumbrous. However, real striking and holding power will certainly be required in the later stages to defeat attempts to break out on the part of the encircled enemy, even if in the early stages airborne armour will have to be prepared to work in combined squadron/company groups until the build up is sufficiently complete for a full armoured division to be employed.

Briefly then, to restate the conclusions reached in this paper : in the first place nuclear warfare between two major Powers is unlikely for the next ten years, while any future conflict which breaks out before inter-national nuclear warfare becomes a practical proposition is likely at first to follow the pattern of 1945 warfare. We should therefore base our plans on improving 1945 methods and techniques, while keeping our minds open to the possibility of a new and revolutionary weapon or technique being developed. Armoured forces, which remained the dominant arm throughout the war of 1939-45, are at present losing their position as the result of the development of anti-tank weapons. Airborne operations, however, provide a ready means for obtaining the special conditions in which armoured dominance still comes about, and it therefore follows that armour will play a prominent part in future airborne operations. The further development of the transport aircraft is likely soon to make this a practical proposition. In these conditions the airborne armoured division is likely to play the same decisive part as the more normal armoured formations did in the late war.

OCEAN CONVOYS IN PEACE TIME

By Commander C. H. Williams, R.D., R.N.R.

IF the recent war has taught us anything it must surely be that merchant shipping is vital to this country and the Empire. Having overcome the German menace and somewhat recovered from our fight, there is much talk of our being prepared and of never again being caught with our fighting Services reduced to the weak state they were in before 1939.

If we do decide that in future we would rather not be "caught short," it may be worth while considering the advisability of retaining in peace time some sort of "working model" of the vast sea convoy system that has been built up in the two wars. The system should be kept really alive and kicking and not merely as a skeleton in some Service office ashore. Great amphibious operations have often been the British role in war. Such operations during both the 1914-1918 war and the recent conflict have shown that, if success is to be attained, co-operation between the fighting Services and the Merchant Navy is essential. During the years of peace there was no organization worth mentioning for ensuring this co-operation. In normal peace times large quantities of material, fuel, stores and men have to be moved by sea to various parts of the world to maintain our naval, military and air forces stationed abroad. This is usually done to some extent by means of Government fleet auxiliaries and troopships, but largely by the ordinary private shipping lines.

It is suggested that in future a nucleus of the war-time convoy system should be maintained in order to carry as much as possible of this Government gear and at the same time to ensure that the practical convoy experience now gained will not be lost. The proposal is that convoys of, say, six or more merchant ships, manned by Merchant Navy personnel, should be regularly employed in peace-time for this purpose. These convoys would consist of troopships, store ships and tankers, and would sail from this country at fixed intervals on routine voyages, carrying the Service stores, equipment and personnel needed to maintain our garrisons and fleets stationed abroad.

The Admiralty could arrange for the assembly of the convoys at a home port, and it would be necessary for the store authorities of the three Services and the officers responsible for manning and reliefs to plan their work to fit the sailing and arriving dates of the convoys. This, it is suggested, would afford useful practice in large scale inter-Service planning.

During the voyage these Government convoys, which could be given secret routes, would afford excellent opportunities for realistic exercises in attack and defence by the fighting Services and by the crews of the merchant ships in the convoys. The many uses for exercise purposes to which such a convoy could be put by the Operations staffs of the Royal Navy and Royal Air Force, as it passed through the various Commands, are fairly obvious. The Royal Navy in particular could gain useful experience of the Merchant Navy and better understanding of some of its difficulties and limitations, while the Royal Air Force and Fleet Air Arm would be able to learn what the various types of merchant ship look like at sea.

The Merchant Navy personnel employed in the convoy would also gain valuable experience in the use of defensive equipment and get practice at working ships in close company—experiences which they never get in the ordinary course of peace-

time seafaring. They would also have the advantage of working with all the fighting Services in much the same manner as in a combined operation in time of war.

It is thought probable that merchant seamen—both officers and men, would readily volunteer for voyages in these convoys if given some slight encouragement, as it would undoubtedly be a useful experience. A senior officer of the Merchant Navy could act as Commodore of the convoy. The fact that a merchant seaman had made such a convoy voyage could be recorded in his Continuous Discharge Book, or by means of a certificate.

These regular troop and store convoys could also be made use of for scientific observations and experiments, such as hydrographic and oceanographic surveys and meteorological work, to mention only three. The merchant ships and their crews could be changed each voyage, so as to ensure that convoy experience will be widespread in the Merchant Navy in future, and not have to be suddenly learnt at sea in the stress of war. It is realized that this organization could not be put into operation at present because of the shortage of shipping, but it could be prepared now while war experience is still fresh.

The foregoing is no more than a rough outline of a scheme which would, it is believed, help to keep the seamen of this country trained and ready to carry out their difficult war-time functions. No doubt the question of cost will arise. Who is going to pay for it ? But surely this could be met from the various Service votes, as all would benefit from the scheme. They have, in any case, to pay for the movements of their personnel and stores.

THE DEFENSIVELY EQUIPPED MERCHANT SHIP AND THE FUTURE

By Captain R. C. Bayne, R.N.

At the end of the War, the defensive armament of all merchant ships against air attack, " E " boats or surfaced U-boats, was taken for granted. A brief review of how this state of affairs was reached, a summary of the problems involved and the difficulties that were overcome may be of interest and also provide a useful guide to the needs of the future.

The 1914–1918 War

In 1915, when German " U " boats started " gunning " our shipping on the high seas, the First Lord of the Admiralty—Mr. Winston Churchill, directed that guns should be mounted in merchant ships for their self-defence. By the end of that war, over 2,000 ships were armed with anti-submarine guns and about 8,000 naval gunners were embarked to man them. There is little doubt that the arming of merchant ships contributed to the defeat of the " U " boat in 1918 and saved many a merchant ship from being sunk, besides putting the " U " boat commander off his stroke.

After the war, the guns were removed from ships and stored for any future emergency, but the provision of gun stiffening in merchant ships, so that guns could be rapidly mounted again, was not continued. The result was that no British merchant ship built between 1918 and 1937 could be armed without first having gun stiffening built into the hull—the longest part of the arming process. About 1937, when the political situation appeared threatening, steps were taken to have the newer and more modern merchant ships stiffened to carry an anti-submarine gun aft, but time did not allow of more than a proportion of the merchant fleet being so prepared before we were again involved in a major war.

The Years 1939–1941

Plans for equipping the merchant fleet in 1939 were largely based on the experiences of the previous war, and dealt principally with defence against the " U " boat and moored mines. Plans for the self-protection of shipping against air attack were sadly behindhand, and the seriousness of the air threat had not been fully appreciated. Some 12-pdr. guns were, however, being converted for high-angle fire when September, 1939, was upon us, and a number of modern close-range A.A. weapons had been ordered for the merchant fleet, but were not ready when wanted.

During 1940 and 1941, the defence of our sea communications, particularly in the narrow seas against air attack, was fraught with difficulty. The threat to our coastal shipping and to ocean-going ships proceeding up the Channel was deadly. From mid-1940 to 1943, the shipping using Southampton, London and other large East Coast ports was very greatly reduced ; nearly all ocean-going ships were diverted and discharged their cargoes at West Coast ports which were not so directly threatened from the air. Nevertheless, coastal traffic had to go on and became more important than ever, as the railways alone could not distribute all the incoming cargoes that were now being unloaded at West Coast ports. The coaster was thus left to face the brunt of the attack by enemy aircraft, which would swoop down to bomb and machine

gun the unfortunate vessels at almost point blank range. To meet this threat coastal convoys, protected by fighter patrols and A.A. escorts, were instituted, and balloons and light close-range A.A. weapons were fitted or supplied to all merchant ships in the danger area.

In the early days, owing to shortage of A.A. weapons, machine-gun teams armed with .303-in. machine guns were embarked as a shuttle service to provide protection in the more dangerous waters (*e.g.*, Bristol Channel, South about to the Firth of Forth). This was never very satisfactory as it was not always possible to contact every ship, and a machine gun, unless mounted on a fixed pedestal, is not a good A.A. weapon. It soon became apparent that the only satisfactory close range A.A. equipment was the fixed-mounting type, and as weapons became more plentiful they were mounted in all coasters and extra gunners only embarked over the more dangerous parts of the route.

When it is appreciated that there were nearly 3,000 coasters operating round the United Kingdom and that it was desirable to equip each ship with anything from two to six machine guns (twin mountings being used where possible), or say an average of four per ship, together with an average of three or four trained Service gunners per ship additional to the normal Merchant Navy crew, one gets some idea of the task involved.

In 1941, the enemy extended the range of his air attacks to ocean-going shipping in the Western Approaches, where convoy had long been in force as a protection against "U" boat attack. The A.A. armaments of the anti-submarine escorts on the ocean routes, however, were weak, since the better armed escorts were helping to protect the Channel and East Coast convoys. Again it fell to providing the merchant ships with better equipment for their own defence; in addition certain merchant ships were fitted with a catapult and fighter aircraft for shooting down the enemy bombers. Bofors guns with Army gun teams, as well as .303-in. machine guns, were mounted in ships proceeding direct to the United States. On arrival there the Bofors guns, which were few in number, were taken out and put in some homeward bound ship, the gun team going with their gun. This shifting of guns from one ship to another put a great strain on the shipyards, was apt to delay ships' sailing and was not always practicable. As more and better weapons became available the Bofors guns were usually left in ships unless required for some special operation.

The number of British and European Allied ocean-going ships was rather more than 3,000, but by the end of 1941 most of them were equipped with anything from two to twelve machine guns and carried anything from two to twelve Service gunners, the number varying according to the size and importance of the ship, and guns and gunners available. Balloon equipment was also fitted so that ships could fly balloons when in the danger area, or when in U.K. coastal waters. In addition various other A.A. devices had been developed, such as the Parachute and Cable (P.A.C.) rockets for defence against close-flying attack, and these and other gadgets were fitted in all ships as supplies became available.

At a secret session of the House of Commons in June, 1941, Mr. Churchill made a speech reviewing the "War at Sea," and stated that on 6th March he had, with the approval of the War Cabinet, issued a "Most Secret" directive to all concerned. This directive, recently made public, dealt with the measures to be taken to enable us to defeat the enemy's attempt to strangle our food supplies and our connection with the United States. Paragraph 6 of the directive read :—

"The Admiralty will have the first claim on all short range A.A. guns, U.P. weapons and P.A.C's that they can mount upon suitable merchant ships plying in the danger zone. Already 200 Bofors or their equivalents have been ordered to be made available by Air Defence of Great Britain, and the factories. But these should be followed by a constant flow of guns, together with crews or nucleus crews, as and when they can be taken over by the Admiralty. A programme of three months should be made."

The seriousness of the situation at that time and the importance of defensively equipping merchant ships is thus clearly demonstrated.

The Years 1942–1945

It was in 1942 that the supplies of the Oerlikon gun—a really efficient close range A.A. weapon, first became available in quantity, and so the task of re-arming nearly 6,000 ships with Oerlikons in place of machine guns was begun. Had these weapons been available or even in production in large numbers in the early days of the War, a tremendous amount of unnecessary labour and effort would have been avoided, and many ships that are now at the bottom would be sailing the seas.

The re-equipping of the merchant fleet with Oerlikon guns went ahead rapidly, and the enemy was soon compelled to change his close-range bombing and machine-gunning tactics, as they were becoming too costly.

By June, 1944, there were over 20,000 Oerlikons mounted in ships, not to mention other weapons and devices, and masters and crews at last felt that they were getting the better of the enemy. The number of Bofors guns available for the Merchant Navy was also steadily increased during 1943 and 1944.

General Principles in Arming the Merchant Fleet.

An accepted principle in the control of shipping is that any ocean-going merchant ship should be prepared to go to any part of the world at short notice, since it is uneconomical to tie ships to certain routes or oceans. Because of this it became necessary to arm all merchant ships for their own defence and to keep a limited number of gunners embarked at all times. For ships that were allocated for special convoys or operations, such as Malta or Russian convoys or the North African, Sicilian or other landings, Bofors guns, extra Oerlikons and additional gunners were provided; time and circumstances usually allowed this to be done.

Another accepted war-time principle was that the work of arming a ship should never delay her sailing. Thus, the arming of a ship might be started at one port, continued at another and finished at a third. To enable this arming work to be expeditiously carried out, to deal with the maintenance of the equipment once fitted, and to arrange for the embarkation of Service personnel to man the guns, etc., special D.E.M.S. staffs were appointed to all the more important British and Dominion commercial ports both at home and abroad.

It is sometimes suggested that since ships sail in convoy and have aircraft and escorts to protect them, it is really unnecessary to arm them. The fallacy of this is threefold:—

First, ships do not always sail in convoy. During the War convoys could only be adopted in the more seriously threatened areas, since there were never enough escorts to allow of a world-wide convoy system. In the less dangerous areas ships, even the slow ones, proceeded independently and had to rely on their own defence if attacked.

Secondly, aircraft and escorts cannot protect a convoy against a heavy and determined air attack. They may seriously hinder and break up the attacking formations, but some enemy aircraft will always get through, and then it is up to the merchant ship to defend herself.

Thirdly, there is always the straggler who may have dropped behind the convoy and who, like the independent ship, has to rely on her own defence.

Besides gun equipment other defensive measures were also taken, such as the fitting of smoke apparatus, paravanes, net defence, radar, etc., but it is not intended to deal with these here. The following extract from the First Lord's speech on the Navy Estimates, 1944, is however of interest as showing the value of equipment fitted in ships for their own defence. He said :—

> " The total effect of these and all other measures to help merchant ships to protect themselves can be gauged from the estimate, which the Admiralty operational research section made, that since July, 1942, the saving effected by those means has been at the rate of roughly 100 ships per year."

Guns Crews

Doubts have sometimes been expressed regarding the wisdom of embarking Service ranks or ratings to fight the guns, it being argued that it is uneconomical in manpower and that the Merchant Navy crew of a ship should defend their own ship. What is not always appreciated is that the Merchant Navy crew are the bare minimum to work the ship ; to expect them to do this and to keep gunwatches and be constantly ready to fight their armament is out of the question.

The practice adopted by Great Britain was to provide sufficient trained Naval gunlayers and seamen gunners, or Army gunners of the Maritime Royal Artillery, to fill the key numbers at each gun, the lower, less skilled duties being carried out by the Merchant Navy. It is interesting to note that the American system provided an Armed Guard sufficiently strong to fight the whole armament without assistance from the Merchant Navy crew. In their ships the strength of the Armed Guard was usually about three times that of the D.E.M.S. gunners in an equivalent British ship. The German system was somewhat similar and was also more extravagant in men than ours.

In September, 1939, though anti-submarine guns were plentiful, the number of Service ratings to act as gunlayers, etc., was inadequate and numerous expedients had to be adopted to raise men. As the War progressed, however, new-entry naval recruits were trained specially for the D.E.M.S. service and the Army came to the rescue by providing Army machine-gunners, who formed the nucleus of that very fine body of men the Maritime Royal Artillery. By mid-1944, the total strength of D.E.M.S. personnel was 39,000, approximately one-third of this number being provided by the Maritime Royal Artillery. The average number of men had risen from two to three per ship in 1941 to over seven in 1944, large liners carrying as many as 30 or 40 men.

Training was another difficult problem. In order to provide as many weapons for arming the merchant fleet as rapidly as possible, every type and mark of weapon had to be pressed into service, and as a man might be embarked and required to fight any of these weapons at short notice, it was desirable that he should have a knowledge of all of them. (By the end of 1941 there were five different kinds of .303 or .30-in. machine guns and fifteen different types of anti-submarine gun.) Again, when a new weapon came into supply, such as the Oerlikon in 1942, it was desirable that all

men should be trained in it as quickly as possible; but the ships and men were scattered all over the world. Furthermore, Service ratings or other ranks embarked in merchant ships are not like naval ratings in a H.M. Ship or Army other ranks in a regiment; they are cut off from their officers, and the continuance of any training on board depends largely on the men's own initiative and the enthusiasm of the master and ship's officers.

The system of training adopted was to provide D.E.M.S. training centres and practice firing ranges at all the larger and more important ports, both at home and abroad, in order to give men "refresher" training whenever their ships were in port. This system worked well and by the end of 1943 it was unusual for a man to go more than about six months without receiving some refresher training somewhere.

As has been said, the Merchant Navy crews were expected to assist in fighting the armament, so training for them was arranged in much the same way as for Service personnel. Merchant Navy men were given every encouragement to take short courses in gunnery whenever the opportunity offered, and for these allowances or lump sum payments were made. The commonest course, taken by over 150,000 men, was the two-day A.A. course which fitted a man to fight, or assist in fighting, an Oerlikon gun or machine gun.

The Future

The Merchant Navy is now being disarmed as rapidly as possible, just as it was in 1918. No one will cavil at this; but it is to the future and our preparedness for another emergency that we must look.

The War found us with anti-submarine guns, but most ships not stiffened to carry them. Now if gun stiffening is incorporated in a ship when she is built, the work is negligible and the cost is small; if it is put in later, the work and cost are greatly increased, and delay before the gun can be mounted is inevitable. It seems logical, therefore, that all our new merchant ships should be fitted with gun stiffening—existing ships already have it.

In September, 1939, we were ill provided with anti-aircraft weapons, and furthermore the seriousness of the air threat was not fully appreciated. It is extremely difficult to foresee or even conjecture what the requirements of the future will be, what with flying bombs, rocket bombs, and atomic bombs in their infancy, but it is a matter which should not be shirked. As long as we bear this in mind and the problem is kept constantly under review and faced up to, we should not again be found wanting.

The War found us lacking in Service personnel to man the guns that had been set aside for mounting in merchant ships. If proper provision is made for this in the future, there should be no difficulty. The requirement is there for all to see.

The training of Merchant Navy personnel was fairly well advanced when war was declared, but the scope and extent of the training was not conceived on a scale comparable with the size of our merchant fleet. If arrangements can be made to continue in peace time the periodical training in gunnery and defence of Merchant Navy officers and men, in much the same way as the Territorials receive yearly training, a great step forward will have been taken.

THE FUTURE OF LIGHT AIRCRAFT FOR THE ARMY

By Major R. E. S. Skelton

During the last two or three years there has been spasmodic argument between the Services regarding the responsibility for the control and provision of light aircraft for the use of field formations of the Army. There has been a growing demand within the Army for a considerable increase in the number of such aircraft at their disposal. But this demand has not been pressed to any great extent, mainly because it has been realized that it would be ill-advised to attempt to change during war-time the present organization whereby the Royal Air Force is responsible for the provision of these aircraft. It has been clear that, in the days of shortage of manpower and material, the requirement for light aircraft could not possibly compete for priority with the need for combat aircraft.

However, the time has now come to reconsider the matter and to examine the problem to see whether the supply of light aircraft for the Army in the future can and should be increased, and whether their requirements can be met by the existing organization. This article is concerned only with the ultra-light type of aircraft—aircraft with a short landing and take-off run which can be operated from improvised strips well forward.

The Army's Requirements

First of all let us consider what are the requirements by the Army of this type of aircraft, and whether these requirements can be met by normal types of aircraft. Briefly, they are as follows :—

(*a*) Artillery observation.
(*b*) Topographical reconnaissance on the immediate front of the Army during mobile phases of the battle.
(*c*) Rapid communications for commanders and staff.
(*d*) Distribution of photographs and urgent mail.
(*e*) Casualty evacuation.
(*f*) Cable laying.
(*g*) Traffic control.

Of these functions, only the first two, and possibly the last, can be carried out in normal aircraft. On the other hand, since all these functions can be adequately performed with light and economical aircraft, it is surely wasteful to employ combat aircraft on these tasks when such aircraft may be required for more important duties and when they can invariably be more economically employed at some depth behind the enemy's lines where light aircraft can rarely penetrate.

Characteristics of the Aircraft Required

Assuming, therefore, that there is a requirement for a light aircraft to perform these functions, it would be apt to consider in some detail the characteristics of the type of aircraft to be employed. It is these characteristics which will determine the best organization for their control and supply.

The functions mentioned above are at present performed mainly by the Auster and Helicopter. I will not here enter into the arguments as to the respective merits

of fixed and rotating wing aircraft. However, I would suggest that the following characteristics are required of whatever aircraft is selected :—

(*a*) A short landing and take-off run.
(*b*) A rapid initial climb.
(*c*) Facility to land across wind.
(*d*) Good manœuvrability.
(*e*) A pay load of about 750 lbs. (two persons, 200 lbs. of equipment, 150 lbs. of fuel).
(*f*) Easy to fly.
(*g*) Reliable and sturdy.
(*h*) Simple to maintain.
(*j*) Cheap to produce and ample in supply.

These aircraft do not require :—

(*a*) A high ceiling.
(*b*) High speed.
(*c*) A radius of action beyond 150 miles (provided long-range fuel tanks can be fitted for long sea crossings).
(*d*) Armament.

An examination of these characteristics shows that they are the same characteristics as those required by the ordinary man for a civilian aeroplane. I would suggest, therefore, that whatever aircraft is developed to meet this civilian demand should be selected by the Service to meet its light aircraft requirement. In this way only will a plentiful and cheap supply be available, and in this way only will it be possible to avoid competing with the needs of combat aircraft for the construction of special aircraft.

The Existing Organization

To meet the Army's light aircraft requirements at present there are a few Auster Air Observation Post Squadrons. In war, the aircraft of these squadrons were frequently employed on duties other than air observation—much to the detriment of their proper role. At present these squadrons are employed on a variety of essential functions for the Army generally. In addition to these squadrons, most R.A.F. headquarters have a communication flight or squadron containing a few light aircraft which can be made available to the Army for communication purposes if urgently required.

The A.O.P. aircraft are piloted by Army officers and maintained by R.A.F. personnel, while Army personnel are provided to meet the units' administrative requirements. The Royal Air Force is responsible for the training of pilots and the provision of aircraft and all air stores.

This organization is very similar to that which existed on a larger scale in most theatres at the end of the War. Let us examine, therefore, what were the shortcomings of the system and what alterations could be made which would overcome these shortcomings. The two main deficiencies in the system were the inadequate supply of aircraft, personnel, and stores and the delay in their delivery to units, and the almost complete lack of light aircraft for all purposes except artillery observation. The latter did not apply to the same extent to the Burma theatre as it did to other theatres, as in the Burma theatre a small number of American light aircraft were placed at the disposal of the British Army, mainly for casualty evacuation.

It is doubtful if any organization will overcome entirely the matter of shortages. Supply is rarely, if ever, adequate in war when the needs of the moment almost invariably outstrip planned provisioning. However, it is suggested that the inadequate supply of aircraft, stores, and personnel will inevitably continue in the future so long as responsibility for the provision of these things remains with the Royal Air Force and the supply of them has to compete in a limited market with the supply of similar items which, in the sphere of the Royal Air Force, are obviously more important.

A Suggested Improvement

I suggest, therefore, that if the Army requires light aircraft in any numbers which it does, they must take over responsibility for the supply of these aircraft The basic reasons for this are :—

(*a*) That the need for light aircraft must be considered in relation to the need for vehicles, guns, and tanks, and not in relation to the need for other types of aircraft.

(*b*) That the system of maintenance and operation of light aircraft should be different from the system of maintenance and operation of combat aircraft, as is the technique of flying such aircraft.

If the Army were to undertake this responsibility, they would be faced with the following problems :—

(*a*) The supply of aircraft.
(*b*) The supply of air stores.
(*c*) The provision and training of pilots.
(*d*) The provision and training of maintenance personnel.

It would clearly be uneconomical and undesirable to set up parallel institutions to the Royal Air Force for the purpose of meeting these requirements. Were this necessary it would probably be better to accept the existing disadvantages and retain the present organization. However, I submit that the type and standard of training required of pilots and maintenance crews for light aircraft is entirely different from that required by crews for combat aircraft, and that therefore requirements (*c*) and (*d*) above can better be met by organizations divorced from the Royal Air Force. As far as the supply of aircraft is concerned, it has already been shown that the type of aircraft required is that normally supplied for civilian use. As in war there would be no other competitor for the supply of this type of aircraft, with the possible exception of the Royal Air Force for *ab initio* training purposes, no serious difficulties should occur through conflicting demands for priority in supply. Finally, air stores, other than aircraft spares which form the bulk of air stores, would have to be provided by the Royal Air Force, following the principle that responsibility for the provision of stores in common use by the two Services rests with the greater user.

Objections to the Proposal

Before discussing in any detail a proposed organization for the force of light aircraft, let us examine the objections to the principle that the Army should undertake full responsibility for their light aircraft.

The first and foremost objection that will be raised is based on the truism that the air is one and indivisible and that everything that moves in it must be controlled by one Service. This truism is based primarily on the chief characteristic of aircraft —their flexibility ; the fact that most aircraft can be switched rapidly from one

employment to another and that their economical and effective employment demands centralized control and control at a level where their best use can be properly assessed. However, the uses to which light aircraft can be put are so different to those of combat aircraft that they lack entirely the flexibility of most types of combat aircraft and therefore this principle does not apply to this particular case. The truism is also based on the necessity for gaining and retaining air superiority before effective use can be made of air, land or sea power. Light aircraft play no part in gaining air superiority, while, since they must always rely on evasion, concealment and anti-aircraft defences for their protection, they are no more and no less dependent for their efficient functioning on air superiority than are the troops on the ground.

The second objection is that it would be uneconomical for the Army to undertake independent study into the technical and operational problems involved in the employment of aircraft. Further, that if light aircraft units are not part of the Royal Air Force, they will not obtain any benefit from the discoveries and improvements, both technical and operational, being continuously made by the Royal Air Force. As far as the former objection is concerned, I contend that the natural relative indifference to light aircraft on the part of the Royal Air Force has proved a handicap in the past, and that the separate study of all matters specifically referring to light aircraft by an interested Service would be advantageous. No difficulty should be encountered in passing to light aircraft units information regarding advances in aviation matters which may affect such units, provided as close and efficient liaison is maintained between the two Services in the future as has been maintained in the past.

Thirdly, there is the question of supply. This matter has already been discussed to a certain extent above, and I will not enlarge further on the matter of the supply of material. The question of personnel requires a little further examination. As far as maintenance personnel are concerned, provided the aircraft are simple to maintain, the high technical skill required of the Royal Air Force maintenance personnel is not required of the men who will look after these light aircraft. To give to them the normal R.A.F. technical training would be wasteful. The average M.T. fitter, after a special course on the maintenance of the type of aircraft concerned, would be able adequately to maintain these light aircraft.

In the case of pilots, apart from *ab initio* training, the training required by them is much less and quite different from the training required by pilots who will be flying R.A.F. aircraft. To employ R.A.F. pilots on flying light aircraft is wasteful of their skill and extremely unpopular among the pilots themselves. This leads to inefficiency. The pilots for these aircraft should be obtained from Army sources and, again except for *ab initio* training, they require a special training.

The final objection to the proposal, and this one must be faced, is the strong feeling in the Royal Air Force that the control by the Army of its own light aircraft would be the " thin end of the wedge " towards the provision of a separate Army Air Arm for the support of the Army. Before the War the possibility existed of this step being taken, and no doubt it would have been right to oppose any action that might lead to it. Experience in the late war has, however, proved so completely the rightness of the present system that there no longer exist any grounds for fearing that such a step could be taken. There are few Army officers who believe such a project to be either desirable or feasible. Those few who do advocate it do so either through ignorance or " with their tongues in their cheeks." Fighting in the air is the responsibility of the Royal Air Force and cannot be undertaken by the Army. But light, unarmed aircraft have nothing to do with the air war. The employment

and operation of such aircraft is more akin to that of surface transport than to that of modern high speed and heavy aircraft.

If the Army is to obtain full benefit from these aircraft, it is clear that the Army must rely upon itself to provide and run them. Failure to do so will inevitably result in an inadequate supply and in inefficiency, for the Royal Air Force cannot devote the attention and resources necessary when fully occupied in more important matters.

Outline Organization

What, then, of the organization that should be set up? The organization must be cheap in peace time, and capable of expansion in war without interfering with the expansion of more important arms and services. It must be flexible to make full use of the flexibility of the aircraft within their limited sphere of usefulness.

Aircraft units must not be tied down to any particular role. Crews must be capable of carrying out all the functions that may be required of them. General control of the units must therefore be retained centrally at Army or Command level, and units allotted to formations as and when desirable.

Pilots cannot be expected to remain on flying indefinitely, nor would it be desirable for officers to remain employed too long in such a specialized role. On the other hand, by virtue of the varied duties involved, a period in a light aircraft unit would be of value to the training and experience of a Regular officer. Pilots should, therefore, be obtained by the secondment of officers from all arms for periods of, say, three years, with opportunities for re-secondment in special cases in order to obtain more senior officers. Reserve pilots in war would be obtained from civilian aircraft owners earmarked for this purpose. Ground crews would be obtained by direct enlistment, with normal terms of service with the Colours and in the Reserve.

The training of pilots could most economically be undertaken in the first place by the Royal Air Force at an elementary flying training school. This training should be followed by a special course run by the Army at which specialized training would be given. This would be analogous to the American light aircraft school, Fort Sill, which undertakes the training of Army pilots and soldier mechanics. As artillery observation would be by far the most important function of the light aircraft units, this work would receive the greatest attention at this school.

An examination of these proposals shows that no expensive changes from the existing organization would be involved if the change were undertaken in the immediate future. There would be a further commitment, as far as the Army is concerned, to provide trained men for maintenance duties. This would, however, be offset by a corresponding decrease in the Royal Air Force in their requirements for manpower. An A.O.P. Operational Training Unit already exists and, with a few minor adjustments, this could economically be changed to a light aircraft school.

Conclusion

The use of light aircraft by the Army is in its infancy. A great expansion is inevitable in the near or distant future. Now is the time to establish a sound basic organization to meet future developments. Developments in aircraft and air warfare are tending to move farther away from the far more limited domestic interests of the Army, and it would be unwise to rely further upon the Royal Air Force to retain interest or devote material, personnel and attention to a matter which will necessarily become less and less important to them.

BRITISH MINELAYING IN THE WAR

A COMBINED CAMPAIGN

AS the sea mine is essentially a naval weapon, the broad control of all sea minelaying operations was vested in the Admiralty for operations at home, and in naval Commanders-in-Chief for operations abroad. The main plans for minelaying operations in Northern European waters during the War were drawn up in the Admiralty, irrespective of whether the mines were to be laid by surface vessel, submarine or aircraft of the Royal Navy or of the Royal Air Force; but a very high degree of co-operation between the Royal Navy and the Royal Air Force was established for the laying of mines by R.A.F. aircraft. To assist in implementing the broad plans drawn up in the Admiralty, a Captain R.N. and a small naval staff were appointed to the staff of Commander-in-Chief, Bomber Command, and a Naval Staff Officer was also appointed to the staff of each of the Air Officers Commanding the bomber groups engaged in sea minelaying. The Royal Air Force armament personnel were assisted by Naval Torpedo Gunners' Mates in the preparation and testing of the mines prior to being loaded on the aircraft.

All mines were designed and supplied from naval sources, but Royal Air Force experimental establishments co-operated in the " air aspect " of aircraft-laid mines.

To deal with the complicated problems of supply and distribution of the different types of aircraft mines to the main airfields concerned, the Admiralty minelaying team held regular meetings in the Admiralty. These meetings were attended also by representatives of the Naval Armament Supply Department, Royal Air Force Technical Departments (who supplied the parachutes for the mines), the Naval Staff from Headquarters, Bomber Command, the Superintendent of Mine Design and representatives of the Naval Torpedo and Mining School in H.M.S. " Vernon."

As a result of British minelaying during the war, approximately 1,050 Axis warships and merchant ships were sunk and a further 540 damaged. The majority of these casualties were caused by mines laid in enemy waters by aircraft, surface vessels and submarines.

The defensive minefields were laid by British, Dominion and Allied surface vessels acting under British control. For the most part, converted merchant vessels were employed. These included large freighters, car ferries and train ferries.

The offensive fields were laid by Royal Air Force and Dominion aircraft, by British naval aircraft, and by British and Allied warships. The ships included fast minelayers, destroyers, motor torpedo boats, motor launches and submarines. More than half of this offensive laying was done by Bomber Command of the Royal Air Force.

The large aircraft of Bomber Command were especially suitable for minelaying purposes owing to their good carrying capacity, and their long range which enabled them to visit areas which were often inaccessible to our surface minelayers or submarines. These areas were for the most part heavily defended; they included such waters as the Baltic and its approaches, the Kiel Canal, the Danube, and all the main French and German river estuaries. As is to be expected, minelaying in such restricted waterways, where evasive routeing is not possible, caused very heavy enemy casualties.

In all theatres a total of 263,088 British mines were laid, the majority being in the large defensive mine barrage. In offensive fields approximately 76,700 were laid. Of this total some 56,300 were laid by aircraft of all types, including a contribution of 47,250 by Bomber Command.

WHAT TO READ

By The Editor

NOW that the War is over many officers, finding that they have more time for study, are asking "what shall I read." One of the two main purposes for which, under the Royal Charter, the Institution exists is the Promotion and Advancement of the Literature of the three Services, and Members can obtain here not only advice on the selection of books but also the use of the biggest professional lending library in the country.

From time to time requests are received for a catalogue, the intention being, no doubt, to scan the Subject lists and pick out books which seem promising. In practice, however, this would scarcely be worth the considerable expense of production for it could never be up to date—and more often than not it is the latest publications that are wanted—while titles and authors are not necessarily the best guide to selection. So far as "what is available" is concerned, Members can safely assume that any book which an officer could reasonably require for professional study, other than Secret and Confidential publications, will be found in the R.U.S.I. Library; if not it will be obtained on request. With the exception of some rare or irreplaceable works and certain reference books, four volumes at a time can be sent on loan.

To those seeking guidance on what to read, therefore, the best advice we can give is, write to the Librarian—a card will do—saying what subject you want to study and he will select some books or send you a list to choose from—whichever you prefer. It will help him and you if you will say what aspect of the subject interests you most; for example, do you want to get the historical background, or are you seeking the most recent authorities or information; are you studying broad principles based on experience in the past or do you want to read about the latest developments and how they are likely to affect the Services in the future? Those are the sort of things which will help him to advise you.

Having made a start, the keen student will not need to be spoon-fed, rather will he want to make his own choice from any list of recommended books or from reading book reviews. In this connection he should not miss the Reviews and list of Additions to the Library published in every R.U.S.I. Journal.[1]

Having indicated how the Institution's Library can help by giving advice and providing books, endeavour will be made in this and subsequent articles to suggest what there is to read on the various subjects which an officer is likely to explore in order to improve his professional equipment. Obviously, in the space available nothing approaching a complete bibliography can be attempted, but the literature mentioned will, it is hoped, assist the student to make his own selection whether by introducing him to a subject which appeals to his interest or by suggesting new sources of information. We are indebted to the Commandants and Director of the Imperial Defence College and the three Staff Colleges for their advice and assistance in compiling the lists of books; but they must not be regarded as either comprehensive or official.

In addition to books there is the R.U.S.I. Journal which often has information not to be found elsewhere; this particularly applies to operations in the late War.

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[1] Other guidance as to what is (and sometimes is not) worth reading amongst new publications can be obtained from the reviews published in *The Times Literary Supplement*, *The Sunday Times* and *The Observer*.

There has not yet been time for the production of official histories, but the Institution has had, and will continue to have the benefit of first-hand accounts of their experiences in the form of lectures and articles by high commanders and other officers with special knowledge. For this reason reference is made to the JOURNALS in which such contributions have appeared in the lists which follow. Members can be provided with back copies from the Lending Library; they will doubtless appreciate the advantage of getting their personal copies of current JOURNALS and not having to rely on finding the Mess copy available when they want it.

Now for the lists: this article will suggest some worth-while literature dealing with :—

International Affairs, including :—
- General Aspects
- Economics and Finance
- International Law
- Foreign Nations

Relations with the Dominions, Colonies, and India.

Imperial Defence, including :—
- Principles
- Geography
- Communications

Higher Study of War, including :—
- Policy
- Principles
- Organization
- Conduct

INTERNATIONAL AFFAIRS

It will be realized that there are necessary limitations to the extent to which literature on such a vast subject as International Affairs can be catered for in an essentially professional library like that of the R.U.S.I. Broadly speaking the aim is to be able to supply books on those aspects of the subject which an officer would wish to study as part of his higher education, and which relate to the interests and responsibilities of the Services in maintaining peace, or to the conduct of war.

Officers wishing to make a wider study of the subject are recommended to write to the Royal Institute of International Affairs, 10, St. James Square, London, S.W.1, for particulars of membership, etc. For those who want to keep in touch with major events but who find they have not time to read foreign news in the daily Press, there is the International Situation Section of the R.U.S.I. JOURNAL.

Here, then, is some of the literature on this subject which the Institution can provide :

GENERAL

The more important publications of the Royal Institute of International Affairs.
The Congress of Vienna 1814-15—Nicholson (1946).
A History of Europe—Fisher—(1934).
Diplomatic History 1713-1933—Petrie.
Dynamic Europe—Strong.
European Balance—Matthews.
Peace or Chaos—Soloveytchik.
Primer of the Coming World—Schwarzchild.

The Time for Decision—Sumner Welles.
European Witness—Stephen Spender.
A Time for Greatness—Agar.

R.U.S.I. Journal.
The Security Council—February, 1946.
U.S.A.'s Contribution to a Security Force—February, 1946.
The Potsdam Conference—August 1945.
Germany in Defeat—August, 1945.
Civil Affairs in Territory Under Military Occupation (Lecture)—May, 1945.
Contemporary South-East Europe (Lecture)—February, 1945.
The Three-Power Conference in the Crimea—February, 1945.
Allied Powers Proposals for the Maintenance of Peace and Security—November, 1944.

ECONOMICS AND FINANCE

The Carthaginian Peace, or The Economic Consequences of Mr. Keynes—Etienne Mantoux (1946).
British Economic Interest in the Far East—Gull (1943).
Economics in Uniform—Lauterback (1943).
Studies in Economic Warfare—Jack (1940).
Britain's Economic Strategy—Francis (1939).
The International Share-Out—Ward (1938).
Raw Materials and Colonies—Chatham House Publication (1936).
England's Crisis—Siegfried (1931).
The Meaning of Money—Withers.
Economic Consequences of the Peace—Keynes (1920).

R.U.S.I. Journal
Inflation, Deflation and Bimetallism (Pre-War)—November, 1932.

INTERNATIONAL LAW

International Law and the World War—Garner.
Law of Naval Warfare—Hall.
Air Power and War Rights—Spaight.
A Treatise on International Law—Oppenheim.
Sea Law and Sea Power—Bowles.
The Strength of England—Bowles.

R.U.S.I. Journal
The Violation of Neutral Waters in the Past—August, 1940.

SOVIET RUSSIA

The following throw some light on Soviet Russia to-day :—
A History of Russia—Pares.
Report on the Russians—W. L. White.
The Growth of the Red Army—D. Fedotoff White.
Report on Russia—Winterton.
Window in Moscow—Alaric Jacob.
The Yogi and the Commissar—Arthur Koestler.
The Dark Side of the Moon—Preface by T. S. Elliott.

R.U.S.I. Journal
Russia's Aspirations in the Middle East—February, 1946.
Russia and the British Empire (Extract from a speech by Mr. Bevin as Foreign Secretary)—November, 1945.

GERMANY

The following are recent books and articles about Germany and the Germans :—

Factors in German History—Barraclough (1946).
The Revolution of the Intellectuals—Namier (1946).
The Course of German History—A. J. P. Taylor.
Assize at Arms (A review of Germany between the Wars and a timely warning for the future)—J. H. Morgan.
Thus spake Germany—Edited by Cook and Totten (1941)
The Problem of Austria—E. J. Passant.
Germany and Europe—F. Darmstaedter.
The Red Prussian—L. Schwarzchild.
The German Mind and Outlook—G. O. Gooch and others.

R.U.S.I. Journal

Displaced Persons in Austria—November, 1945.
Germany and Japan as Enemies—August, 1945.
Germany in Defeat—August, 1945.
The Unconditional Surrender of Germany—May, 1945.
The Ruhr—May, 1944.
The Politico-Military Strategy of the Nazis—August, 1941.

SPAIN

Ambassador on Special Mission—Templewood (Sir Samuel Hoare).

THE MIDDLE EAST

British Rule and Rebellion—Simson (1937).
The Middle East—Major Polson Newman (1928).

R.U.S.I. Journal.

The War in the Middle East (Lecture)—February, 1943.
The Situation in the Middle East—February, 1930.
Arabia and the East Flank of the Red Sea—August, 1927.

PALESTINE

Rebellion in Palestine—Marlow (1946).
Great Britain and Palestine 1915-1945—Chatham House Publication (1945).
The Arab Awakening—Antonius (1945).
Conquerors of Palestine through Forty Centuries—Lock (1920).
Palestine of the Jews—Bentwich (1919).

R.U.S.I. Journal

Palestine : Report of the Royal Commission 1937—August, 1937.
Britain's Position in Palestine—November, 1936.
Service Problems in Palestine—November, 1936.
Palestine : The Shaw Commission Report (1930)—August, 1930.
Egypt and Palestine—November, 1929.
Palestine, Syria and Transjordan—November, 1927.

PERSIA

The Persian Problem—May, 1946.
Persia and the Powers—Amazavi—(Diplomatic Relations 1941-46) (1946).
Persia—Wilson (1932).
Persia—Sykes (1922).
A History of Persia—Sykes (2 vols.) (1915).

R.U.S.I. Journal
British Interests in the Persian Gulf—February, 1933.
The Strategic Situation of Persia—May, 1930.
Persia from a Strategic Standpoint—May, 1928.

IRAQ

R.U.S.I. Journal
Shaikh Ahmed of Barzan and the Iraqui Government—May, 1932.
Strategic Problems of Iraq—November, 1932.
Great Britain and Iraq—November, 1929.

THE FAR EAST

Japan Fights for Asia—Goette (1945).
China and Japan—Pratt (1944).
News from Tartary—Fleming (1936).
Inside Asia—John Gunther.
The Tropical Far East—J. S. Furnival.

CHINA

China under the Empress Dowager—J. P. Bland and E. Backhouse.
The Challenge of Red China—Gunther Stein.
China in Peace and War—Mme. Chiang Kai-Shek (1940).
China—Her Life and Her People—M. Cable and F. French.

R.U.S.I. Journal
China and the War—May, 1944.

JAPAN

Behind the Japanese Mask—Craigie (1946).
Japan—Sir George Sansom.
Ten Years in Japan—J. C. Grew.
Japan in Defeat—Chatham House Publication.

R.U.S.I. Journal
Japan and the Japanese (Lecture)—February, 1946.
The Surrender of Japan—August, 1945.

RELATIONS WITH DOMINIONS, COLONIES AND INDIA

DOMINIONS AND COLONIES

English Social History—Trevelyan.
Colonies and the International Conscience—Jones and Hinden.

R.U.S.I. Journal
Re-armament in the Colonial Empire—November, 1939.
The Strategy of Colonization—November, 1939.
The Statute of Westminster—May, 1933.

INDIA

Verdict on India—Beverley Nicholls (1945).
India—A Re-statement—Coupland (1945).
Pakistan—Sirdar Ikbal Ali Shah.
Home to India—Santha Rama Rau.
The Future of India—Coupland (1943).
India and the Indian Ocean (historical)—Panikkar.
The Lost Dominion—Al. Cartill (1924).

R.U.S.I. Journal

The Indian Fighting Services in the War (Lecture)—August, 1945.
The Army in India (Lecture)—February, 1937.
The Future of India's Defence—November, 1934.

IMPERIAL DEFENCE

Principles

Elements of Imperial Defence—Boycott.
Defence is OUR Business—Smythe.
The Navy and Defence—Chatfield.
Imperial Policies—Gwynn.
Imperial Defence—Rowan-Robertson.
Imperial Defence—King-Hall.
Empire Unity and Defence—Fuller.
Changing Conditions of Imperial Defence—Cole.
Growth of British Policy—Seeley.

R.U.S.I. Journal

Imperial Defence (Trench Gascoigne Prize)—May, 1946.

History

Imperial Defence 1588-1914—Fuller.
Imperial Defence and Capture at Sea in War—Richmond.
Imperial Commonwealth—Elton.
Our King—Tangye.
The British Commonwealth—Grigg.
The British Commonwealth—Ramsay Muir.
Britain and the British People—Barker.
The English People—Brogan.
Empire in Eclipse—Jebb.
Problem of the Commonwealth—Curtis.
The Empire in these Days—Coupland (1935).

Geography

Imperial Military Geography—Cole (1937).
A Political Geography of the British Empire—Fawcett.

Communications

Some Aspects of Imperial Communications—Wakeley (1924).
Seaways of the Empire—Sargent.
Year Book for 1944-45 (issued by Air Transport and Civil Aviation).
Imperial Air Routes—Salt (1930).
Air Liners and Air Ports—Sidney Veale.
Seaborne Trade—Fayle.

R.U.S.I. Journal

The Indian Link in the Chain of our Imperial Air Routes—August, 1931.

THE HIGHER STUDY OF WAR

Literature relating to the Higher Study of War can conveniently be classified under Policy, Principles, Organization and Conduct.

Policy

World Crisis (1914-1918)—Winston Churchill.
War and Policy—Wilkinson.
National Police and Naval Strength—Richmond.
Bombing Vindicated—Spaight.

R.U.S.I. Journal

The Responsibilities of Victory—May, 1945.
The Disarmament of the Aggressor—May, 1944.
The Allied Powers Proposals for the Maintenance of Peace—November, 1944.
Propaganda in War—February, 1943.
Economic Warfare—February, 1943.
The Dangers of Appeasement—February, 1942.

Principles

Principles of War—Foch.
Reality of War (Abridgement of " On War " by Clausewitz)—Murray.
The Living Thoughts of Clausewitz—Greene.
Reformation of War—Fuller.
Foundation of the Science of War—Fuller.
Operations of War—Hamley.
Naval Warfare—Richmond.
Science of War—Henderson.

R.U.S.I. Journal

Principles of War (A Dialogue)—August, 1929.
Principles of War (Criticism of the above)—November, 1929.

Organization

R.U.S.I. Journal

Some Major Lessons of the War—February, 1945.
Universal Service—The Women's Part—November, 1944.
Universal Service—A Suggested System—August, 1944.
The Industrial Population of Great Britain and the War—November, 1941.

Conduct

World Crisis (1914-1918)—Winston Churchill.
Soldiers and Statesmen—Robertson.
Government Control in War—Hankey.
Government and War—Bird.
Representative Government and War—Ross.

R.U.S.I. Journal.

The Machinery of the Committee of Imperial Defence—May, 1939.
Passchendaele—February, 1935.

Further articles will deal with the literature of such subjects as Co-ordination of the Services; Strategy; Combined Operations; Major Wars and Campaigns; Staff Work; Sea, Land and Air Warfare; Science and the Services; Tactics and Weapons; Morale and Welfare.

POST-WAR IMPRESSIONS OF THE FAR EAST

By Colonel E. Foster Hall, M.C.

THE chance to re-visit the Far East soon after the close of the Japanese war and in the course of duty came to me as a double windfall. I left Kandy in Ceylon on 11th November, 1945; and my tour included a journey down the Burma-Siam railway constructed by Allied prisoners of war, arrival in Calcutta during students' riots, a flight over the hump to Kunming and Hongkong and then on to Shanghai and Tokyo, a further flight southwards over the Philippines, Christmas with the Australians in Morotai in the Central Pacific, and a final flight via Labuan to my new home in Singapore.

The Burma-Siam Railway

The Burma-Siam railway was indeed worth a visit. It starts at the Burma end at Thambyuzayat on the old Moulmein-Ye railway and runs 250 miles to Bampong on the Bangkok-Malaya railway. To a non-technical eye there seemed at first to have been no outstanding constructional difficulty; but a railway official pointed out that many of the rivers which had to be bridged had awkward and difficult currents which made bridge building complicated and difficult. That this is so was proved by the frequency with which they were washed away. The railway runs along a natural valley throughout its length. There are no steep gradients or hair-pin bends; the rise is gradual up to the Burma-Siam frontier at Three Pagodas, and the ground then drops equally gradually, the line running alongside a navigable river—the Kwe Noi, which was used for the movement of prisoners and stores. Throughout the 250 miles there are innumerable rivers, streams and other depressions to be bridged. These bridges were made of unseasoned wood cut straight from the jungle by the prisoners themselves and were mainly constructed by squads of officers, who were of course untrained for this type of work. Towards the Bangkok end there is a series of three viaducts running along a cliff face to connect up various rock ledges, and there are a certain number of cuttings blasted through rock or dug through the more usual laterite soil. But even if there were no major constructional difficulties, there were many difficulties of other kinds. The construction of a railway in this area is said to have been considered in the 'twenties and rejected because of the nature of the country. That it was built in just over ten months, through tropical jungle and in monsoon conditions, was due to complete disregard by the Japanese for human life. Men worked day in, day out, leaving camp before light and returning, if at all, after dark, being flogged to their work and flogged at it. Sick men were forced to work even when obviously incapable. None, except those who were fortunate enough to survive, can ever picture what they went through.

In November the climate seemed pleasant: warm days, not unduly steamy, and nights that are quite cold in November and get colder into January. Yet even this was a matter of suffering to prisoners without blankets or even clothes. Often they could do nothing but crouch round such fires as they were allowed. The hazards of ill-treatment, lack of food and all the illnesses that resulted were not, however, the only ones that they had to face. Allied bombing also inflicted casualties and added to the work of railway maintenance. The few attempts made by the Japanese at permanent bridging were destroyed and reliance was then placed entirely on wooden bridges. These bridges were quickly repaired when damaged and it must also be admitted that the Japanese evolved an excellent system of hidden loop lines

and sidings so that, though they could not protect the permanent way, they did succeed to a great extent in saving their rolling stock, or more accurately our rolling stock, as it came from the Malayan and Burman railways.

At Tamarkan, towards the Siamese end, the Nipponese built a memorial to all nationalities that lost their lives in the building of the railway and unveiled it with pomp and ceremony in the presence of many prisoners. None will ever know accurately the numbers commemorated by this memorial.. It is known that 700 Japanese lost their lives. The death roll of prisoners of war from the U.K., Australia, U.S.A. and the Netherlands East Indies is believed to approximate 15,500. But of the coolies collected from Malayan tin fields and rubber plantations, from Singapore and Burma, no records were kept and no exact details are known. The lowest estimate puts their loss at 18,000; the highest at 150,000. Such was the cost in lives of this purely strategic railway.

As one goes down the railway, one sees the cemeteries that bear silent witness to the toll taken of our prisoners. There are in all some 144 cemeteries large and small, ranging from a solitary grave to one of 1,500 graves. They are now carefully tended and the graves will shortly be moved to cemeteries already selected and under construction near either end. These in due course will come under the care of the Imperial War Graves Commission and will be open to visits by relatives, as would probably not be the case with the existing 144 cemeteries.

When the War ended, a Dutch prisoner of war, who was a reservist captain and formerly an official of the Javanese railways, took control of this railway and it is now operated by a Japanese railway unit under his direction. Many of the junior control staff, signalmen, etc., were his own employees in Java, brought to Siam by the Nipponese.

Bangkok

Bangkok is an attractive city. It was in the course of being modernized when the War reached it in 1941. Broad boulevards, one of which has a carriage-way about 150 feet in width, and fine modern buildings had been made and there are many other buildings, the construction of which had then to be stopped. Side by side with this new construction are to be seen the old temples, shrines and palaces, made attractive by the Siamese style in roofs and by their use of colours. The shopping centre is reminiscent of many a Chinese city, and the shops seemed as well stocked as ever they could have been. Food is plentiful and a meal at one of the big hotels or Chinese restaurants is a thing to be remembered. The city had been bombed by us but the damage was not extensive, being mainly confined to the river wharves and godowns, the area of the goods station and the vicinity of the bridges over the river. The Memorial Bridge, after it had been damaged, was put out of action by the Thais, as the Siamese then called themselves, to prevent further bombing. It is said that this was at our suggestion. A Bailey bridge now fills the gap where a span was removed and the road is open to traffic.

Bangkok is a city of canals and has been referred to as the Venice of the East. These canals carry considerable barge and canoe traffic and there are several interesting floating markets. They are also probably the cause of the innumerable mosquitoes in the place whose number does not yet seem to have been affected by some D.D.T. spraying. The city gave me the impression of being run entirely for its own inhabitants and scarcely at all for European visitors—a refreshing change from other Eastern ports of call. In most cases street names are shown only in

Siamese script. There are few European signs or notices and in the great majority of cases knowledge of European languages seems to be confined to "O.K."; this expression, used wherever our prisoners of war passed by, is at one time or another a greeting, an invitation, the acceptance of an offer or a request, and a word of farewell.

Calcutta

On arrival by air at Calcutta, a city I scarcely know and perhaps because of that fact cordially dislike, our party was marooned at the airport. Students were overturning military vehicles in order to show their sympathy with those Indians who had supported Japanese aggression by joining and forcing others to join the Indian National Army. Next day we moved into the city unmolested and, though the trouble was continuing in the Howrah area, it had left Chowringhee.

My journey to Hongkong, to be really accurate, avoided the crossing of the hump. Aircraft following the route from Ledo to Kunming have, for a short time, to rise to some 20,000 feet. We, however, made our preliminary stop on the Imphal plain and did not have to go above 14,000 feet. Kunming lies in a saucer about 6,200 feet above sea level, near to the edge of a large lake. The air was clear and brisk and the night quite cold, especially by comparison with Calcutta. It seemed a long, straggling and uninteresting place, but it was refreshing, after India, to note the compulsory use of pneumatic tyres, even on handcarts, and the provision of a narrow lane on either side of the road for slower-moving traffic. Kunming became a University city during the War and is suffering from the political exuberance of its students.

Hongkong

It was a thrill to come in over Hongkong and to see once again the most beautiful of our Eastern possessions. One could note the damage to the docks, both on the island and the mainland, and to the neighbouring suburbs, and also the apparent absence of damage both in Victoria and Kowloon. One also could not fail to notice the massive, ugly and unfinished Japanese memorial erected on Magazine Gap, the destruction of which, if contemplated, will be as difficult as must have been its construction. In Victoria itself damage is very slight. All the memorials have gone, presumably for scrap metal, as well as the bronze lettering in the plinths; but except for that fact and the absence of the Lions of the Hongkong and Shanghai Banking Corporation, little seems outwardly to have changed. On the Peak above the May Road level, the destruction of the houses is reported to be complete, looting for firewood having supplemented the work of the Japanese invasion. Prisoners of war were confined at Shamshuipo on the mainland, and internees in Stanley Camp on Hongkong Island. The impression I gained was that, after the first outbreak of murder, rape and drunkenness, from which perhaps Hongkong suffered worse than any of our possessions, the treatment of prisoners and internees was as good as, if not better than, at other places. This statement is not meant to belittle the hardships due to intense shortage of food and clothing and the many problems that were caused by close confinement and petty Japanese tyranny. On all sides one heard grateful references to the loyalty of Chinese employees and their many touching acts of kindness; actions such as that of the widow of a No. 1 Boy, murdered by the Japanese on their arrival, who was waiting at the camp entrance with her late husband's best suit of clothes for "Master" to put on. And it is said that he arrived in London in them.

Shanghai

Shanghai does not seem to have lost its cosmopolitan character though it has lost many of the comforts of its pre-war existence. The weather was perfect for December—cold, brisk and with a warming sun, but the sun, alas, could not warm the buildings, from a great many of which the Japanese had removed all radiators. Destined for Japan as scrap, they were reported to have been found in a field near Shanghai and it may be that they will soon be restored to their accustomed positions.

The shops in Shanghai are a wonderful sight. Prices have risen owing to the number of American Service men with money to spend, but many things seem still to be reasonably cheap. The town is crowded, as always, and a good proportion are members of the American Forces with a sprinkling of the British Navy. New night clubs seem to be opening every night of the week, but close early owing to a curfew. An excellent Russian ballet was playing to crowded houses of United States and British Service personnel and the Russian community. Concerts display "Full House" notices and Chinese opera also attracts Americans eager for new experiences. It is early yet to see the full effect of the transfer of authority in the old International and French settlements to the Chinese. There is, however, little reason for hope that the administration will be as efficient as before. There may be outward improvements such as the planting of trees in what was Avenue Edward VII and has now been renamed in honour of Generalissimo Chiang Kai Shek, though the road itself is not yet being repaired. There may be other outward changes such as the renaming of all the streets, including such famous ones as the Bund and Bubbling Well Road. But there are signs already that graft and corruption are affecting the hospital, police, fire and other services. From the point of view of my personal safety I was glad I was not there on 1st January when the rule of the road was changed in Shanghai, as in all China, from the left to the right. One should, however, in fairness add that the Chinese municipal authorities are now co-opting European residents to co-operate with them.

The greatest difficulty seems to be that of exchange. The visitor is puzzled by the multiplicity in types of currency—China National dollar, Central Reserve Bank dollar and Customs Gold Unit notes are all in circulation and all have different values; in addition the United States dollar is acceptable everywhere.

In China, internees were housed in six camps in and around Shanghai, at Yangchow up the Yangtse, and at Weihshien in Shantung. There were very few British prisoners of war in China proper, apart from the senior officers' camp North of Mukden, but a number were kept in Formosa in order to work in the copper mines there. The conditions of work and the conditions in most of the camps were indescribable, and the death rate in Formosa amounted to two out of every seven or eight prisoners.

Japan

The high light of my trip was undoubtedly the few days I spent in the Yokohama and Tokyo districts. The Japanese towns have been hit hard. The devastation is not as great as after the 1923 earthquake, because the new steel and concrete buildings erected after that disaster have resisted the fire bombs that were mainly used in the War. High explosive was, it appears, only used in certain factory areas and on the dockyards. I was not able to visit Hiroshima or Nagasaki. The main streets of Yokohama and Tokyo are more or less intact, but away from them are acres and acres of destruction and devastation being turned now into shanty

towns of salvaged corrugated iron huts and a few newly-made wooden huts, booths and stalls. The twenty miles between the two towns—twenty miles of heavy industrial undertakings—are miles of destruction and damage. The electric railways and trams are still working, but the shortage of fuel is causing severe cuts in services. One of the freaks of bombing is to be seen in the British Embassy area, where walls separate the untouched buildings from a completely devastated area with trees blasted on the outside and sprouting healthily on the inside. Or perhaps this is an example of the accuracy of the bombing!

It is impossible for a visitor to judge the attitude of a people like the Nipponese. On arrival about 7.30 a.m. I saw some thousands of people, men and women, going to work. Of all these thousands, only three were to be seen chatting cheerfully. But it must be remembered that it was 7.30 on a cold Winter's morning—and they were going to work! They are suffering from many shortages. The only thing they seem not to lack is money; but there is little on which to spend it. Food is scarce, though General MacArthur has stated that there will be no actual shortage. Markets, I noticed, were labelled "For the residents of such and such an area only." Clothing is also scarce and there are few men who do not wear some part of their old uniforms. A large number still wear a gauze pad over their mouths as a protection against infection. Accommodation is almost unobtainable, and numbers huddle nightly in the subways of the railway station. The most serious scarcity will be fuel. Not only have they lost several sources of supply, but the Koreans or Formosans, I am not certain which, who used to work the Japanese mines have gone home. It was obviously necessary to recruit and train Japanese labour, but the Government seemed to think they had only to wait and the American forces would take action. They are realizing now that action in this matter is their responsibility, but they have left it very late.

U.S. Forces and the Stars and Stripes are everywhere to be seen. The Services have taken over all the big buildings in Tokyo and Yokohama for military or naval purposes. Every European type hotel throughout the country has been put into use as messes, living quarters or holiday resorts. Famous hotels such as the Fujiwa at Miyanoshita and Fuji View are officers' leave centres, and others are similarly allotted to enlisted men. British troops are seldom in evidence. The Royal Marine guard on the British Embassy in Tokyo and the Royal Navy guard on the Consulate in Yokohama win the admiration and use up the films of many United States troops. A few naval personnel are to be seen, but the British Army is not represented in Tokyo and, even when it does arrive, it will be based near a large Japanese naval base in the South and well away from the hub of Japan. After a visit to Siam and Hongkong, and after hearing tales of Formosa, it came as a shock to see open fraternization, mixed picnics, dancing, hand-holding and shopping expeditions between our American Allies and the Japanese. Memory can be very short.

Quite a large number of our prisoners were taken to Japan. Their treatment was harsh and the death roll heavy. In all some 1,900 Empire prisoners were allowed to die, and of these about 1,500 came from the home country, with the remainder from Australia, Canada and India.

Fujiyama in the clear morning air is always a wonderful sight and it was a joy to see it through the verandah of the British Consul-General's undamaged house in Yokohama. But in our flight southwards we had the good luck to catch it without its usual daytime cap of cloud, and its beauty helped to take away the nasty taste left by the docile servility of an ex-enemy who has shown what a savage primitive beast he really is and almost certainly will remain for a long time to come.

The Central Pacific

I had not realized before how mountainous Japan is, how little room there is for cultivation and living, and how thoroughly every possible strip is used to best advantage. Our first night was spent near the southernmost tip of Japan, whence we flew to Morotai in the Central Pacific with halts at Okinawa, Laoag in Luzon and Tacloban in Leyte.

There is little information to be added to that already published in the Press about Okinawa and Leyte. Signs of damage by the recent typhoon were apparent in the former place and both, by their airfields, harbour installations and camps, gave a vivid impression of the thoroughness of the preparations made by the American forces for the invasion of Japan.

Once again the mountainous nature of the majority of these islands surprised me; the coastal strip varying in size but never being very deep.

Morotai is a Central Pacific island in the Halmahera group to the West of New Guinea. Selected as a base for the Australian military forces for their share in the Philippines campaign, it became their headquarters. The speed of that campaign, however, made the use of Australian forces unnecessary and they turned their attention to Borneo. Morotai is a pleasant island, about the same distance North of the Equator as Singapore and with a similar climate. Camps are pitched among the coconut palm plantations, a procedure not without danger as coconuts are apt to fall without warning, and bathing seems practicable from most of the camps. Here as elsewhere in my trip the conversation of Australian, American and British troops seemed to turn on age and service groups or points about discharge. There is little doubt that this frame of mind is having a very great effect not only on the attitude of the troops but also on the framing of policy throughout the Far East.

Morotai was quite a pleasant place for Christmas, and my Australian friends were most hospitable, but it was nice to be on one's way once more to Singapore and interesting to visit Labuan, an island off the coast of British North Borneo and once an integral part of the Straits Settlements. Our Colonial administration is often derided or reviled, but the following story, if true, gives the other side of the picture. A senior American officer, himself the executive of a State party machine, is said to have remarked of Labuan: "Well, I guess we must hand it to you British for your knowledge of how to administer colonies. They are real glad to see you back here and that is more than we can truthfully say of some of our possessions." In Borneo, I was told, toddlers greeted the forces in excellent English, a language the use of which had been forbidden by the Nips since before these children had learnt to speak at all. A school teacher is also reported to have said that they all knew the British would come back, though they came earlier than expected, and that many people who had never learnt English before took lessons in it during the War.

Singapore

So I went on to Singapore—an island I knew so well and loved ten years ago. What a thrill it was to approach from over Eastern Johore, pass westwards over the Straits to the causeway and follow the road to Singapore and Kallang airfield; and then, because Kallang was temporarily out of action, to go on over Siglap and Changi to Seletar. The thrill of seeing well-remembered places and of meeting old friends of all nationalities is still with me.

Here again one heard stories of the little acts of kindness so often done by the Chinese for our prisoners and internees; acts done in many cases in 1942 and 1943 when hopes of a British return were at their lowest. Many Eurasians, especially those in the Volunteer forces, shared the captivity and trials of the British. Both Chinese and Eurasians were with few exceptions bitterly anti-Japanese.

On the whole the Malays are accused of being treacherous, but the worst abuse is kept for the Singapore Sikh community—ex-policemen, night-watchmen and moneylenders, who gave ready help to the Japanese as gaolers and earned the hatred of the prisoners they ill-treated. There is a fervent hope that these men will never again be enrolled into the police. There is also a certain amount of bitterness at the leniency being shown to those who organized and led the Indian National Army.

Impressions gained in hurried visits are notoriously dangerous and often inaccurate. What I have written here are only impressions and if any reader notes inaccuracies he must place the blame on me. My task concerned the graves of our prisoners of war and I came away with a bitter hatred of the savage and brutal Nipponese. I came away also having had a glimpse of the resiliency of human nature which gives hope that good may emerge from the evils of war.

THE INTERNATIONAL SITUATION

AFTER ONE YEAR OF PEACE

A YEAR after the end of the greatest war the World has ever endured finds the aggressors beaten to their knees and being subjected to that retribution which they rightly deserve; but far from this leaving a world at peace, the nations seem to be as contentious and suspicious as they were before the War.

Optimists may say that we are going through a phase of regeneration and that this must necessarily involve examination and comparison of interests and ideals which, although they may at this stage emphasize differences, will ultimately make for better understanding, tolerance, and neighbourly relations.

Pessimists may see in the present acrimonious discussions and world-wide unrest little else than the perpetuation, even the intensification, of the influence of those evil genii, greed and fear, which have been the instigators of all wars. Indeed they may even argue that, were it not for the fact that memory of the recent conflict with all its losses and sufferings makes a recurrence of war the greatest fear of all, we should even now be heading for another cataclysm.

The realist may well conclude that, whatever the causes of the present controversies and unrest, the important thing is that there should be no weakening of the influences and forces which prevent national ambitions or internal disorders developing into war.

The most potent of those influences is, or should be, that exercised by the Powers which combined so successfully to combat the danger of world-wide domination by races particularly unfitted to wield unlimited authority. It will be indeed tragic if that great alliance should be disintegrated through irreconcilable ideologies and interests.

The British have, naturally, more in common with the people of the United States than with those of any other great country, and in the continuation of good relations and co-operation in international affairs of our two nations lies the best hope for the preservation of world peace. Yet even here we find some differences in outlook and domestic interests. Our difficulties in discharging our Mandate in Palestine, under post-war conditions, are not made easier by pressure from the United States of America for the admission of 100,000 Jewish refugees into that distracted territory. That, it is admitted, is largely due to the importance of the Jewish vote in impending elections. In America, too, there is wide-spread support for the policy of British evacuation of India, but not very general understanding of the racial conflicts within a vast territory—which is only called India because British rule and justice for more than a century have made it a coherent country; nor, it is to be feared, is it fully appreciated on the other side of the Atlantic that the one thing which is delaying the self-government, promised and offered by a succession of British governments to India, is the political differences of the largest sections of the people; nor is it always realized that the one thing on which the opposing leaders are repeatedly united is in criticism and abuse of the regime which at least stands for law, order, and public security.

The Soviet government of Russia permits no party politics and is therefore, from the British interpretation of the word, no more democratic than the Nazi or Fascist regimes. The effect is a fixation that any criticism of or even lack of sympathy

with their regime must be of foreign origin and, as such, a challenge and even a menace to the State. This sense of political insecurity leads to over-compensation of at least two kinds: abusive propaganda directed against the two principal Powers with a different political ideology—Britain and the United States; and persistent endeavours to enlarge the territorial area in which Soviet influence shall be predominant and where foreign intervention can be debarred.

China is still very loosely knit politically, and is more concerned with internal than with external problems; but by virtue of sheer weight in numbers and vast area of territory she has great potential influence for the future welfare of the Far East.

France, although unable to claim the status of one of the unconquered nations, is being given every help to recover her place in the World and, if she can attain political stability, may help materially to restore the balance of power amongst European peoples.

THE PARIS CONFERENCE

With this background, the setting is not too propitious for the full Peace Conference which assembled in Paris on 29th July, but discussions there are not being confined to the views and requirements of the former Allied Powers, for no less than twenty-one nations, including some which were neutrals in the late war, are represented.

The Conference has taken on from where the five Foreign Ministers left off on 12th July. The immediate task is to negotiate peace treaties with Italy, Rumania, Bulgaria, Hungary and Finland, and representatives of those late-enemy States will be heard.

Much preparatory ground was covered by the Foreign Ministers at their Conference, but that assembly cannot be said to have been very harmonious, and at times M. Molotov's propensity for saying "No" threatened to bring about an *impasse*. However, some progress was made, more particularly as regards the terms which it is proposed shall be dictated to Italy. In view of that nation's change of heart after her military defeat, the downfall of Mussolini, and the practical assistance afforded to the Allies by a new government, Italy seems likely to be let off more lightly than the other major aggressors. At the moment, however, there is little object in detailing proposals regarding Italian frontiers, colonies, reparations and limitations of fighting Services, which may be modified appreciably by the Paris Conference before they become agreed conditions.

PALESTINE

Turning East to the scenes and centres of the most acute unrest to-day, we come first to Palestine. Those who wish to read a concise appreciation of the situation in that unhappy country should read the "Report of the Anglo-American Committee of Enquiry regarding the Problems of European Jewry and Palestine."[1] The recommendation by that body that "100,000 certificates be authorized immediately for the admission into Palestine of Jews who have been the victims of Nazi and Fascist persecution" should be read with the context of the rest of the Report, from which it is too often divorced, more particularly the passage which asserts that, as a Holy Land "sacred to Christian, Jew and Moslem alike," Palestine "can never become a land which any race or religion can justly claim as its own." It is thus "dedicated to the precepts and practices of the Brotherhood of Man . . ."

[1] Issued by H.M. Government as a Blue Book, 20th April, 1946,; H.M. Stationery Office, Cmd. 6808, 1s. 3d. (1s. 5d.).

These noble sentiments must find warm support by idealists the World over, but they are as yet but tender seeds which require a peaceful pasture if they are to come to fruition. With racial animosity and terrorism rampant, Palestine is probably further from Utopia to-day than any other part of the world, not even excluding India; moreover Britain bears the sole responsibility and a large share of the expense of administrating the country and of preventing internecine warfare. It is not unnatural therefore that the Government should be saying, in effect, to the United States: before we endorse the principles of this Anglo-American Committee, may we expect practical assistance in giving effect to them?

The latest project for dividing the country into British, Arab and Jewish zones recalls the Report of the Royal Commission, under Lord Peel, of 7th July, 1937.[1] Having reached the conclusion that the Arab-Jewish differences were irreconcilable and that the existing Mandatory system provided no solution to the problem, that Report recommended the establishment of a Jewish and an Arab State, and the retention of an area which would include the Holy Places under a new and permanent British Mandate. After a lapse of ten years, during which conditions have gone from bad to worse, culminating in the blowing up of British headquarters in Haifa by terrorists and the loss of over 90 lives, no better solution seems to have been forthcoming.

EGYPT

In considering what is to be the future of Palestine, it is necessary to bear in mind the future in Egypt. By the Anglo-Egyptian Treaty of 1936, we agreed in principle to the withdrawal of British forces from Egypt except that British troops would remain in the vicinity of the Suez Canal in order to ensure, with Egyptian co-operation, the defence of that waterway.

On 7th May last, the Prime Minister—Mr. Atlee, informed Parliament that "The Government of the United Kingdom have proposed to withdraw all British naval, military and air forces from Egyptian territory and to settle in negotiations . . . arrangements to be made by the Egyptian Government to make possible mutual assistance in time of war or imminent threat of war in accordance with the alliance." The Foreign Secretary—Mr. Ernest Bevin, in debate, said that it was not now a popular thing in international affairs to maintain troops on other people's soil. He had recommended to his colleagues that they should begin negotiations by proposing to do what we had promised to do from the first day we went to Egypt—to evacuate our troops, and to proceed from that basis to decide what should be substituted for it. "If there can be no substitute to protect this great artery [the Suez Canal], it is quite true that the Treaty must stand," said Mr. Bevin.

As Mr. Churchill has pointed out, the strategical importance of British interests is not limited to the defence of the Canal; the security of the zone South of the Canal is equally vital for, in time of war, the Canal might be blocked by "lucky shots" yet, under adequate naval and air protection in the Eastern Mediterranean and Red Sea, troops could disembark, travel by land, and re-embark at the other end of the Isthmus.

Clearly, Egypt is not and is never likely to be strong enough by herself to defend this zone against serious attack; the crux of the matter is, therefore, can we be certain that in all circumstances this vital route will be available to us unless British forces are at all times within striking distance to defend it? As a corollary, the question arises where must those forces be stationed.

[1] See Journal of August, 1937, p. 617.

It is these important problems which must be kept in mind before we give up strategical bases in the Middle East which might prove very difficult or costly to recover if they were needed.

PERSIA

Moving further East, we find more trouble brewing for British interests in Persia. It would seem that the Soviet-supported Tudeh party which have been causing so much unrest in North Persia [1] have extended their activities to threaten the oilfields and refineries in the South. Serious strikes and rioting have been fomented, and as a precautionary measure for safeguarding British and Indian lives and property in the district, a brigade has been sent from India to Basra, in Iraq.

There is no intention that these troops shall enter Persia except in a grave emergency, which it is hoped will not occur.

PEACE AND THE SERVICES

The Security Council of the United Nations Organization appears to be a very long way from reaching the goal of that international Security Force which is to ensure peace. Until or unless that is achieved, each nation must continue to do its share in preserving order in the World by effectively policing its own sphere of responsibility.

It is no good blinding ourselves to the fact that the aftermath of the War has brought with it dangers to the coherence and security of the Empire second only to those from which we have just emerged, even if up to now they have only involved local passages of arms. The Middle East and India are smoldering volcanoes and we have enemies who would welcome the embarrassment to us if they irrupted.

However righteous our cause and however good our case should we be challenged by the U.N.O., it is on our own fighting Services that we still have to rely to uphold British interests and to ensure that having won the War we do not lose the Peace.

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[1] See International Situation in Journal of May, 1946.

CORRESPONDENCE

(Correspondence is invited on subjects which have been dealt with in the Journal, or which are of general interest to the Services. Correspondents are requested to put their views as concisely as possible, but publication of letters will be dependent on the space available in each number of the Journal.—EDITOR.)

ARMY WELFARE

To the Editor of the R.U.S.I. Journal.

SIR,—I have read with interest the article on "Six Years of Army Welfare" by a local A.W.O. Local Army Welfare officers bore the brunt of Services welfare at home, always having to work very hard and frequently at considerable financial cost to themselves.

The constant strain of interview, often with people who were difficult, and almost always with those who could not state their case clearly, is hard to imagine unless one has been acquainted with the work.

Most of these unpaid officers had to sacrifice much or all of their leisure in carrying out their duties, and I do not think their work has, as yet, been properly recognized. The article has all the merits of information from the front line, but it has also I think some of the defects of front line mentality, which tends to be perhaps unduly critical of directing organizations.

For instance, to blame overseas S.S.A.F.A. for referring cases to L.A.W.O's is unjust, as in matrimonial cases at all events that had been agreed with the War Office as the safest practice in this very tricky line of business. Of course many cases turned out, fortunately, to be trivial that had seemed anything but trivial to a worried soldier overseas, and, so far as I know, there was nothing to prevent a L.A.W.O. from asking the S.S.A.F.A. lady to do the interviewing if that seemed the wisest approach. As regards legal aid the catch in unorganized assistance was that a well-intentioned L.A.W.O. who was without adequate legal knowledge would sometimes give a customer advice that landed him in financial or matrimonial disaster.

The author, like many others in his position, feels that no welfare staff officer understood his trials and his woes. I know that when I was associated with welfare at Command level there were L.A.W.O's who thought this of those employed in the Command office although a great quantity of individual cases were dealt with there, including over seven thousand personal interviews a year. I would even put in a word for welfare staff officers at the War Office, although I had my own troubles with some of them; they were normally selected as having had considerable regimental service and one must not forget that the new Directorate of Army Welfare had a hard time with other departments of the War Office in getting what it wanted. If I have said anything critical of the opinions of the author of this article I have nothing but admiration for his work and that of his colleagues.

I think the unselfish devotion of local Army Welfare officers is one of the important imponderable factors that led to victory.

RONALD ROSS,

13th May, 1946. *Lieut-Colonel.*

SIR,—I have read with interest, in the May JOURNAL, the criticism of my short article [1] by "ANOTHER LOCAL."

He is apparently unaware that until the relevant Army Council Instruction is amended or cancelled, certain matters connected with the "erring wife" can only be dealt with by the L.A.W.O.

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[1] See "Six Years of Army Welfare" by A Local Army Welfare Officer in the JOURNAL of February, 1946.

He need have no fear that the war-weary L.A.W.O. will develop into " a busybody intruding on the preserves of a Commanding Officer." Most of us are only too willing to fade out of the picture, but in my experience Adjutants and " Unit Welfare Officers," especially in Training Regiments, continue to apply for advice and help about subjects which they should by now be capable of dealing with themselves.

In conclusion I would point out to " ANOTHER LOCAL " that his spirited defence of the District Welfare Officer is merely an irrelevant platitude ; I never met an individual holding such an appointment during the six years under review, and I certainly did not mention him in my article.

17th June, 1946. " LOCAL ARMY WELFARE OFFICER."

To the Editor of the R.U.S.I. Journal.

A NAVAL FILING SYSTEM

SIR.—I believe that Major Runacres' article on "A New Filing System for the Army," which appeared in the February JOURNAL provides something towards which many officers of the Royal Navy have been fumbling for a long time.

Correspondence in the larger of His Majesty's Ships is dealt with by the Captain's Secretary, assisted by the half-dozen offices of the various Heads of Departments. Each office develops voluminous files of reports, notes, orders and rulings ; the organization of these files depends on the whim, or genius, of the departmental Head.

My experience, as Gunnery Officer of a cruiser, was that skilled advice on the subject of filing was not available. For a year and a half my system (which I copied from a battleship whose organization I knew) worked well and quickly. The third year of the commission was, however, the testing time, and when my relief came to take up the threads there were signs that both my system and that of the Captain's Secretary were neither simple nor detailed enough for the future. I imagine that the officer who relieved me reorganized the office system. I hope so.

The indexing of Admiralty Fleet Orders is an example of the existing misdirected organization. In each office of each Specialist officer the weekly issues of Orders are indexed. The Admiralty publishes a quarterly index—but the departmental manuscript indexes are necessary because these Orders cover so wide a field that a simple alphabetical index does not meet the case. For lack of a universal reference system a hundred small jobs of this sort waste the time of men at sea.

The filing and self-index system proposed by Major Runacres would lighten the seagoing officer's burden in this matter of correspondence to a very considerable degree. Our need is for a system which, besides being easy to work is ready-made for us. It must provide its own index, be infinitely expandable, yet not cumbersome in simple matters. A decimal system—such as Dewey's—devised to cover a multitude of matters in the bibliotechnical and business fields should meet these requirements.

The further possibility of using a system common throughout the Service suggests almost unlimited advantages in office work.

C. LE M. SCOTT,
Lieutenant-Commander, R.N.

GENERAL SERVICE NOTES

GREAT BRITAIN

IMPERIAL DEFENCE COLLEGE

On 23rd May, General Sir William Slim, first Commandant since the War of the recently reopened Imperial Defence College in Belgrave Square, London, gave the Press some information concerning that institution.

The object of the College is, broadly, " to produce throughout the Empire a body of senior officers of the fighting Services and civil officials who will be capable of holding high commands and key appointments in the structure of Commonwealth defence, both in peace and war ; men who will have not only a full grasp of their own special subjects, but a sound knowledge of how those subjects dovetail into the complete Commonwealth effort."

The directing staff of the College is drawn from each of the fighting Services and the Civil Service. At present it is composed of Rear-Admiral G. H. E. Russell, Major-General J. F. M. Whiteley and Air Vice-Marshal Sir Hugh Lloyd and Mr. T. S. Chegwidden (from the Ministry of Production). The Commandant of the College is drawn in turn from each of the fighting Services.

Thirty students are taking the present course, which opened last April, but next year that number will be more than doubled. All the Dominions, except South Africa, are already represented. Next year's higher total will be mainly due to there being more Civil Servants.

RECRUITMENT CAMPAIGN

In May, the Government opened a recruitment campaign for voluntary Regular service in the Armed Forces. It is hoped that by the end of this year the Royal Navy will have been increased by 50,000, the Army by 100,000 and the Royal Air Force by 100,000 men.

It was emphasized that the recruitment campaign for the Regular forces and the question of compulsory national service are separate problems. We must have Regular forces recruited from volunteers on a comparatively long-service engagement to meet our inescapable commitments. No system of compulsory service can provide sufficient experienced non-commissioned officers or skilled technicians or, under normal conditions, men for commitments in various parts of the world.

COMPULSORY SERVICE FOR THE FORCES

On 30th May the Minister of Labour and National Service announced in the House of Commons the Government's decision that, as a transitional measure, young men called up for the Forces during 1947 and 1948 will serve for a fixed period. This will be two years for those called up during 1947, and if no unforeseen circumstances arise the period will be progressively reduced for those called up during 1948.

The call-up will, with certain exceptions, be confined to men reaching the age of 18 in the two years mentioned. Allowing for any volunteers and for deferments and the sick, it is estimated that 190,000 men will be called up in each of the years 1947 and 1948.

The Government has also decided to continue the W.R.N.S., the A.T.S. and the W.A.A.F. on a voluntary basis as permanent features of the Forces of the Crown.

STRENGTHS AND CASUALTIES IN THE WAR

A White Paper on the strength and casualties of the armed forces and auxiliary services of the United Kingdom from 1939 to 1945 was issued on 6th June. The casualties of the armed forces are not quite final, since the fate of all the men reported missing has not yet been determined.

Strengths

The total strength of the armed forces on 31st August, 1939, was 681,000. Between that date and 30th June, 1945, another 5,215,000 were taken into the Services. Of this total of 5,896,000 men :—

923,000 served in the Royal Navy,
3,788,000 served in the Army,
1,185,000 served in the Royal Air Force.

The peak figure was 4,683,000 in June, 1945.

The Women's Auxiliary Services began the war with 21,000. Up to 30th June, 1945, 619,000 more women were taken in. Of this total of 640,000 :—

86,000 served in the W.R.N.S.
307,000 served in the A.T.S.
219,000 served in the W.A.A.F.
28,000 served in the Nursing Services.

The peak of mobilization in the Services other than the armed forces (wherein the peak was not reached till a year later) was reached in June, 1944. At that date the figures were :—

W.R.N.S.	74,000
A.T.S.	199,000
W.A.A.F.	174,000
Nursing Services	19,000
Merchant Navy	180,000
Royal Observer Corps :	
Men, whole-time	6,000
Men, part-time	22,000
Women, whole-time	3,000
Women, part-time	2,000
Home Guard :	
Men, part-time	1,727,000
Women, part-time	31,000
Civil Defence :	
Men, whole-time	231,000
Men, part-time	1,253,000
Women, whole-time	58,000
Women, part-time	358,000

Casualties

The total casualties (killed, wounded, missing and prisoners of war) of the United Kingdom in the War were 950,794.

Total casualties in the armed forces were : Royal Navy, 73,642 ; Army, 569,501 ; Royal Air Force, 112,296.

In killed, the total casualties were : Armed forces 264,443 ; Women's auxiliary services, 624 ; Home Guard, 1,206 ; Merchant Navy and fishing fleet, 30,248 ; civilians, 60,595.

The statistics given above are those of the United Kingdom, not of the British Empire. The majority of the losses suffered against Japan were Indian.

NEW WAR MEDALS

The Prime Minister announced in the House of Commons on 6th June, that the King had instituted two new medals for service in the War—a War Medal and an India Service Medal.

The first was intended for the full-time armed forces for non-operational as well as operational service. The second was for three years non-operational service by members of the Indian Forces. This latter award would not be given to anyone qualifying for the Defence Medal. The ribbons were now being woven and would be issued as soon as possible; the medals themselves could not be ready for some time.

When the present qualifications for the campaign stars were drawn up the War still continued. The service they were intended to commemorate had not been completed. It had now been possible to examine the whole matter in retrospect, and some of the qualifications had been made less onerous. For instance, the time qualification for the France and Germany Star had been reduced to one day, as in the case of the Africa Star.

The King had also approved a recommendation that the bronze oak leaf emblem signifying a Mention in Dispatches should be worn on the ribbon of the new War Medal. The plastic oval badge given to those awarded a civil King's Commendation for brave conduct was to be replaced in due course by a more permanent emblem of silver laurel leaves. When this civil award had been granted for service in the War the silver emblem would be worn on the ribbon of the Defence Medal, should the recipient have qualified for this latter distinction. In addition a small silver badge was to be instituted for those granted civil King's Commendations for valuable service in the air.

The Prime Minister added that a White Paper had been issued, with an appendix giving a summary of the conditions of award of the Campaign Stars as they would now stand.

SOUTH-EAST ASIA

It was announced from South-East Asia Command Headquarters, Singapore, on 19th June, that a South-East Asia Defence Council had been set up with headquarters in that city, consisting of Mr. Malcolm Macdonald, Governor-General of the Malayan Union and Singapore (Chairman), Lord Killearn (Special Commissioner in S.E. Asia) and Lieut-General Sir Montagu Stopford (Acting Supreme Allied Commander, S.E. Asia), to keep under constant review the defence problems of the area and to direct combined planning on all relevant matters.

Governors of British colonies and protectorates in S.E. Asia and the commanders of the fighting Services would be invited to attend or send representatives when matters affecting their responsibilities were under discussion, and the Council would keep in touch with defence authorities in the South-West Pacific, especially Australia and New Zealand.

CANADA

War Casualties

The total of Canadian war casualties, as announced by Canadian Defence Headquarters, were 104,925, viz.:—

Killed—Navy, 1,965; Army, 32,712; Air Force, 16,694	41,371
Missing—Navy, 3; Army, 5; Air Force, 324	332
Wounded—Navy, 319; Army, 51,464; Air Force, 1,395	53,178
Prisoners (now released)—Navy, 97; Army, 6,430; Air Force, 3,517	10,044
Total ...	104,925

Of the total casualties, 97,022 were suffered in Europe, 2,486 in Asia and 5,417 in the Western Hemisphere.

NAVY NOTES

GREAT BRITAIN

H.M. The King

In pursuance of His Majesty's pleasure, Admiral Sir Bruce A. Fraser, G.C.B., K.B.E., has been appointed First and Principal Naval Aide-de-Camp to the King from 27th April, 1946, in place of Admiral of the Fleet Lord Tovey, G.C.B., K.B.E., D.S.O.

Captain (S) E. C. Fenton has been appointed a Naval Aide-de-Camp to the King from 7th April, in place of Captain (S) C. A. Bowen, placed on the retired list.

Colonel Second Commandant (acting Major-General) G. E. Wildman-Lushington has been appointed a Royal Marine Aide-de-Camp to the King from 1st April, in place of Colonel Commandant (temporary Brigadier) R. A. D. Brooks, promoted to Major-General.

The following officers have been appointed as Honorary Physicians to the King: Surgeon Vice-Admiral H. St. C. Colson, in place of Surgeon Vice-Admiral Sir Sheldon Dudley, retired; Surgeon Rear-Admiral A. E. Malone, in place of Surgeon Rear-Admiral Sir Reginald Bankart, deceased; Surgeon Rear-Admiral J. O'Flynn, in place of Surgeon Rear-Admiral J. Falconer Hole, deceased.

The following officers have been appointed as Honorary Surgeons to the King: Surgeon Rear-Admiral F. J. D. Twigg, in place of Surgeon Rear-Admiral C. V. Griffiths, retired; Surgeon Rear-Admiral H. R. B. Hull, in place of Surgeon Rear-Admiral W. H. Edgar, retired; Surgeon Rear-Admiral H. M. Whelan, in place of Surgeon Rear-Admiral A. Maclean, deceased.

Surgeon Captain (D) J. T. Wood has been appointed an Honorary Dental Surgeon to the King, in place of Surgeon Rear-Admiral (D) E. E. Fletcher, retired.

The Rev. B. G. Beale, R.N., has been appointed an Honorary Chaplain to the King, in place of the Rev. G. W. Page, R.N., retired.

It was announced on 18th May that the King had appointed Lieutenant (S) Albert W. Stone, R.N. (retired), to be a Serjeant at Arms to His Majesty, in the room of Major Sir Harry Stockley, resigned.

Board of Admiralty

Admiral Sir Charles Kennedy-Purvis, G.B.E., K.C.B., died on 26th May, shortly after relinquishing the post of Deputy First Sea Lord, which he had held since 1942. In the post-war organization of the Admiralty this post has lapsed, and also that of Assistant Chief of Naval Staff (Weapons). Rear-Admiral Robert D. Oliver, who had held the post of Assistant Chief of Staff (Weapons), was on 20th April appointed a Lord Commissioner of the Admiralty and Deputy Chief of Naval Staff.

Fifth Sea Lord (Air).—It was announced on 18th July that the King had approved the appointment of Vice-Admiral Sir Philip L. Vian to be a Lord Commissioner of the Admiralty and Fifth Sea Lord (Air) in succession to Rear-Admiral Sir Thomas H. Troubridge, to date 23rd September, 1946.

Flag Appointments

C.-in-C. Pacific Fleet.—It was announced on 24th April that the King had approved the appointment of Vice-Admiral Sir Denis W. Boyd to be Commander-in-Chief, British Pacific Fleet, in succession to Admiral Sir Bruce A. Fraser, to date early June, 1946. The change of command took effect on board H.M.S. "Duke of York" at Singapore on 11th June, after which Admiral Fraser left in that ship for England, while Vice-Admiral Boyd left for Hong Kong in the aircraft carrier "Venerable." In an interview, Sir Denis Boyd was reported to have said that there would be no battleships in the British Pacific Fleet.

C.-IN-C. SOUTH ATLANTIC.—It was announced on 1st May that the King had approved the appointment of Vice-Admiral Sir Clement Moody to be Commander-in-Chief, South Atlantic, in succession to Vice-Admiral Sir Robert L. Burnett, to take effect in July.

REAR-ADMIRAL (D), MEDITERRANEAN.—It was announced on 13th May that Rear-Admiral E. D. B. McCarthy had been appointed Rear-Admiral (Destroyers), Mediterranean Fleet, to date early June, 1946.

DIRECTOR OF NAVAL INTELLIGENCE.—The appointment was announced on 3rd July of Rear-Admiral W. E. Parry to be Director of Naval Intelligence, in succession to Rear-Admiral E. G. N. Rushbrooke, to date September, 1946.

AMERICA STATION.—It was announced on 18th July that the King had approved the appointment of Vice-Admiral Sir William G. Tennant to be Commander-in-Chief, America and West Indies Station, in succession to Vice-Admiral Sir Irvine G. Glennie, to date the end of October, 1946.

GENERAL.—The following appointments have also been approved, and were announced on 18th July :—

Rear-Admiral Sir Thomas Troubridge to be Admiral (Air), in succession to Rear-Admiral G. N. Oliver, to date 25th September, 1946.

Rear-Admiral J. M. Mansfield to be Flag Officer (Submarines), in succession to Rear-Admiral G. E. Creasy, to date end October, 1946.

Rear-Admiral G. N. Oliver to be Assistant Chief of Naval Staff, in succession to Acting Rear-Admiral C. E. Lambe, to date 2nd December, 1946.

Rear-Admiral P. W. B. Brooking to be Chief of Staff to the Head of British Admiralty Delegation, Washington, in succession to Commodore 1st Class A. W. Clarke, to date end July, 1946.

Rear-Admiral H. W. U. McCall to be Senior British Naval Officer, Middle East, in succession to Vice-Admiral Sir William G. Tennant, to date early August, 1946.

Rear-Admiral P. Ruck-Keene to be Flag Officer-in-Charge, Ceylon, in succession to Rear-Admiral J. M. Mansfield, to date early August, 1946.

Vice-Admiral Sir Cecil Harcourt was received by the King on 26th June upon relinquishing his appointment as Commander-in-Chief, Hong Kong, which he had held since August, 1945.

Admiral Sir Ralph Leatham left Portsmouth on 30th April in the escort carrier " Reaper " to take up his appointment as Governor and Commander-in-Chief of Bermuda, in succession to Lord Burghley, and was sworn in on 9th May after his arrival at Hamilton.

It was announced on 25th June that Vice-Admiral E. L. S. King had been appointed Admiralty Representative Governor of the Royal Naval Benevolent Trust, in place of Vice-Admiral H. S. Monroe, who had resigned.

PROMOTIONS AND RETIREMENTS

The following promotions have been made, to date 6th May :—

Vice-Admiral Sir Arthur J. Power, G.B.E., K.C.B., C.V.O., to Admiral ; Rear-Admirals L. V. Morgan, C.B., C.B.E., M.V.O., D.S.C., and C. B. Barry, C.B., D.S.O., to Vice-Admiral.

The following promotions and retirements have been approved, to date 5th July :—

To be promoted to Rear-Admiral :—

Captain P. Ruck-Keene, C.B.E., D.S.O., A.D.C.
Captain P. W. B. Brooking, D.S.O., A.D.C.
Captain (acting Rear-Admiral) M. J. Mansergh, C.B., C.B.E.
Captain H. W. U. McCall, D.S.O.
Captain S. H. T. Arliss, D.S.O.

To be placed on the Retired List in the rank of Captain :—

Captain Sir Philip W. Bowyer-Smith, Bt.
Captain N. V. Grace.
Captain J. G. Y. Loveband.
Captain (Commodore 2nd Class) H. B. Crane, C.B.E.
Captain Q. D. Graham, C.B.E., D.S.O.
Captain A. H. Maxwell-Hyslop, A.M.

HALF-YEARLY LIST.—The following promotions have been made, to date 30th June, 1946, except where different dates have been specially indicated :—

Commander to Captain.—U. H. R. James, W. W. R. Bentinck, M. Hodges, P. H. E. Welby-Everard, Sir C. E. Madden, R. S. Foster-Brown, K. A. Short, C. W. Greening, M. J. Evans, D. E. Holland-Martin, G. M. Sladen, R. C. M. Duckworth, G. A. Thring, M. Everard, H. C. Browne.

In addition, the following officer, ex-prisoner of war, has been promoted Captain with seniority of 30th June, 1945 : G. H. Beale.

Lieutenant-Commander to Commander.—R. A. Fell, W. W. Fitzroy, J. D. Hayes, C. R. Williams, A. N. Rowell, J. L. Rathbone, O. G. Cameron, D. S. Tibbits, M. C. Creagh-Osborne, R. F. T. Stannard, R. S. Blacker, H. R. Law, J. A. Meares, P. A. Roche, E. G. P. B. Knapton, E. D. Norman, L. W. L. Argles, G. E. P. Milburn, A. Davies, E. T. Graham, F. P. Baker, E. G. Savage, E. T. L. Dunsterville, H. S. Mackenzie, R. F. Phillimore, J. V. Wilkinson, P. D. Gick, A. H. Diack, J. R. Gower, R. N. Everett.

In addition, the following officers, ex-prisoners of war, have been promoted to Commander with seniority as indicated :—

30th June, 1944. O. S. Stevinson.
31st December, 1944. A. S. Jackson, K. Williamson.
30th June, 1945. J. de F. Jago, S. H. Beattie, V.C.
31st December, 1945. P. N. Buckley, F. Roddam Twiss, N. J. Scarlett-Streatfeild, W. J. Munn.

Engineer Rear-Admiral C. W. Lambert has been placed on the Retired List, to date 10th May, 1946.

HONOURS AND AWARDS

BIRTHDAY HONOURS

The following were included in the honours conferred on the official celebration of the King's Birthday on 13th June :—

Order of Merit.—Admiral of the Fleet the Right Hon. Andrew Browne, Viscount Cunningham of Hyndhope.

Viscount.—Acting Admiral Lord Louis Francis Albert Victor Nicholas Mountbatten.

K.C.B. (*Military*.—Vice-Admiral Charles E. Morgan.
Vice-Admiral Victor A. C. Crutchley, V.C.
Vice-Admiral John H. Edelsten.

K.C.B. (*Civil*).—Charles Seymour Wright.

C.B. (*Military*).—Surgeon Vice-Admiral H. St. C. Colson, Rear-Admiral R. S. G. Nicholson, Rear-Admiral H. J. Egerton, Rear-Admiral R. Shelley, Rear-Admiral H. C. Bovell, Engineer Rear-Admiral C. W. Lambert, Engineer Rear-Admiral S. O. Frew, Instructor Captain W. I. Saxton.

C.B. (*Civil*).—H. D. MacLaren, J. G. Lang.

G.B.E. (*Military*).—Vice-Admiral Sir Henry Bernard Rawlings.

K.B.E. (*Military*).—Vice-Admiral George T. C. P. Swabey (Retired), Vice-Admiral

Robert R. Turner (Retired), Vice-Admiral Henry C. Phillips (Retired), Rear-Admiral Patrick Macnamara (Retired), Temporary Surgeon Rear-Admiral Cecil P. G. Wakeley.

C.B.E. (*Military*).—Colonel S. J. Bassett, R.M. (Retired), Vice-Admiral O. Bevir (Retired), Acting Captain I. R. H. Black, R.N., Captain S. N. Blackburn, R.N. (Retired), Engineer Captain D. N. H. Bowen, R.N. (Retired), Superintendent Sybil R. B. Cécile, Marchioness of Cholmondeley, W.R.N.S., Acting Captain J. S. Cowie, R.N., Commodore (2nd Class) H. B. Crane, R.N., The Rev. I. Davies, Chaplain, R.N. (Retired), Acting Captain E. G. B. de Mowbray, R.N. (Retired), Rear-Admiral J. S. G. Fraser (Retired), Temporary Captain (Sp.) M. G. Gill, R.N.V.R., Surgeon Rear-Admiral C. V. Griffiths, Captain (E) W. S. Jameson, R.N., Engineer Captain A. G. Jarrett, R.N. (Retired), Commodore (2nd Class) J. Lawrence, R.I.N., Captain (S) C. K. Lloyd, R.N. (Retired), Acting Captain C. E. Maconochie, R.N., Captain B. L. Moore, R.N., Captain (S) R. D. Paffard, R.N. (Retired), Acting Rear-Admiral (S) R. H. Pearce, Temporary Captain (Sp.) A. Pritchard, R.N.V.R., Major-General A. H. E. Reading, R.M., Acting Captain (S) J. T. Shrimpton, R.N., Captain J. L. Storey, R.N., Rear-Admiral G. W. Taylor (Retired), Acting Captain C. Thomas, R.N. (Retired), Temporary Commander H. Vandervell, R.N.V.R., Captain E. C. Withers, R.I.N. (Retired), Surgeon Captain (D) J. T. Wood, R.N.

C.B.E. (*Civil*).—Temporary Captain B. Freedman, R.M.

C.M.G.—Commander H. C. Arnold-Forster, R.N. (Foreign Office), R. R. Powell, Esq. (Admiralty).

C.I.E.—Captain P. H. Learmont, R.I.N.

C.V.O.—Captain E. M. C. Abel Smith, R.N.

Knights.—Captain Ernest G. Brookes, Commodore Master, British India Steam Navigation Fleet; Lieutenant-General Gerald R. S. Hickson, R.M., Secretary, King George's Fund for Sailors; Commander Arthur W. Jarratt, R.N.V.R., Deputy Chairman and Film Industry Liaison Officer, R.N. Film Corporation; Robert W. Wharhirst, Director of Armament Supply, Admiralty.

Awards for War in the Far East

On 11th June it was announced that the King had approved the following awards for distinguished services during the War in the Far East:—

K.C.B. Vice-Admiral Eric J. P. Brind, C.B., C.B.E.

C.B. Captain J. P. L. Reid, R.N.

K.B.E. Vice-Admiral Colin Cantlie, C.B., D.S.C.
Rear-Admiral Benjamin C. S. Martin, C.B.E., D.S.O.

C.B.E. Acting Captain (S) J. R. Allfrey, O.B.E., R.N.
Captain Sidney Boucher, R.N.
Captain B. C. B. Brooke, R.N.
Acting Captain (E) Sir John R. Coote, Bt., D.S.C., R.N.
Captain P. K. Enright, R.N.
Captain D. H. Everett, R.N.
Acting Captain W. R. Fell, D.S.C., R.N. (Retired).
Acting Captain (E) J. G. C. Given, O.B.E., R.N.
Rear-Admiral W. R. Patterson, C.B.
Captain H. A. Traill, O.B.E., R.N.

Organization

Cruiser squadrons and destroyer flotillas of the Royal Navy reverted as nearly as possible to their pre-war numbering on August 1st. This has been done to preserve the long-standing accociations which individual squadrons and flotillas have formed with local British communities in various parts of the World, and also because most fleet trophies and mementoes are inscribed with these numbers.

The new numbers are as follows :—

HOME FLEET.—10th Cruiser Squadron has become 2nd Cruiser Squadron; 2nd Destroyer Flotilla has become 4th Destroyer Flotilla; 17th Destroyer Flotilla has become 5th Destroyer Flotilla.

MEDITERRANEAN FLEET.—15th Cruiser Squadron has become 1st Cruiser Squadron; 14th Destroyer Flotilla has become 1st Destroyer Flotilla.

EAST INDIES FLEET.—5th Cruiser Squadron has become 4th Cruiser Squadron.

BRITISH PACIFIC FLEET.—2nd and 4th Cruiser Squadrons have become 5th Cruiser Squadron.

SOUTH ATLANTIC STATION.—Cruisers have become 6th Cruiser Squadron.

AMERICAN AND WEST INDIES STATION.—Cruisers have become 8th Cruiser Squadron

PERSONNEL

RETIREMENT OF OFFICERS.—It was announced by the Admiralty on 1st June that applications from permanent officers to retire or resign their commissions can be considered at present only on the strongest compassionate grounds. It may be possible by September to relax the conditions to some extent, particularly for officers over the zone for promotion. So far as can be foreseen at present, there is no prospect of any permanent officers being "axed," as after the war of 1914-18. On the contrary, when requirements are more accurately known, it will probably be necessary to introduce a scheme of short service commissions for certain Reserve officers who volunteer to assist in filling the gap likely to exist during the next few years between the number of permanent officers on the active list and the number of officers required to meet commitments.

GRANTS FOR CADETSHIPS.—In reply to a question in the House of Commons on 26th June, the Parliamentary Secretary to the Admiralty announced the institution of grants from public funds, up to a maximum of £150, to impecunious parents of successful candidates in the Special Entry examinations for Naval Cadetships. In future, it was stated, no candidate should be prevented by lack of means from joining the Navy as a Special Entry Cadet.

RECRUITING CAMPAIGN.—A recruiting campaign for voluntary normal regular service and short service was inaugurated on 16th May for all H.M. Forces. Speaking at a Press conference, Mr. John Dugdale, Parliamentary Secretary to the Admiralty, in the absence abroad of the First Lord, said that whatever might be the future of conscription, men entering the Navy under such a system could neither provide crews for ships on foreign stations nor the men with the long experience and technical qualifications required for the higher ratings. The Navy in peace must rely on its system of long term voluntary engagements, as in the past. A four-year engagement would bring a total of £125 in bounty and gratuity, plus £8 or a civilian outfit in lieu. Powers would be sought to make initial bounty and terminal gratuity exempt from income tax.

SERVICE CONDITIONS.—The Admiralty issued to the Fleet in May information on improvements that are to be made in service conditions, so that men whose time is due to expire soon may not be deterred from volunteering for a further period because of uncertainty about future conditions.

Improvements in the habitability of ships were outlined. Ashore, the modernization of as many permanent home naval establishments as possible has been accorded the highest priority in work to be undertaken in the next few years. The Admiralty wishes to limit to the minimum the periods when married men are separated from their families. The provision of married quarters at bases abroad is being investigated, and arrangements are under consideration for the granting of sea passages at the public expense to the families of men drafted to foreign stations. For men stationed ashore, commissions abroad will probably remain at 2½ years, but for men afloat there are under consideration

schemes to reduce periods of absence from the United Kingdom to 18 months or a year, but it will not be possible to do this for all types of seagoing ships. For the present it is necessary to retain the war-time scale of foreign service leave (seven days for each six months of foreign service, plus one day a month for broken periods), but the peace-time scale (22 days a year) will be restored as soon as possible. Supply and production facilities at present limit progress in improving uniform, but a new and more comfortable working dress and an improved type of cap are already in production.

Extensions of Service.—As it has been found necessary to take special measures to increase the strength of the Royal Navy and Royal Marines, an Order in Council of 15th May, 1946, published in the *London Gazette* on 21st May, sanctions the payment of bounties and gratuities to men who extend their service, or undertake to do so, or who rejoin under the special arrangements. Naval ratings and Royal Marines serving on "hostilities only" engagements who extend their service by three or four years, and those discharged either from regular or "hostilities only" engagements who rejoin for three or four years, will receive a bounty of £33 on signing the engagement, unless they have already received civilian clothing benefits, in which case they will receive £25. A gratuity of £25 is granted for each full year of extended service which will be accumulated and paid on discharge at the end of the engagement. Men invalided during the engagement or otherwise discharged, except for misconduct, will receive £25 for each complete year of service and an appropriate amount for the uncompleted year. No gratuity will be payable to men discharged for misconduct. Extended service will not count for both pension and gratuity should a man complete 22 years qualifying service for pension during his extended service. Naval ratings and Royal Marines still serving on regular engagements who sign an undertaking before 31st October, 1946, to extend their service for three years from the date on which their current engagement expires, if they are then required to do so, will receive a similar bounty and gratuity if the latter is more favourable than the gratuity normally payable in respect of such service. Supplementary service will not count for both pension (or increase of pension) and gratuity. Treasury approval of these proposals is given with effect from 15th April, 1946.

Change of Titles.—An Order in Council of 15th May, published in the *London Gazette* on 17th May, states that the titles of Gunner's Mate and Torpedo Gunner's Mate seriously handicap senior ratings when applying for civilian employment because of misunderstanding arising from the different construction placed upon the term "mate" as used in industry. It was accordingly approved to change the titles of these ratings to Gunnery Instructor and Torpedo Instructor respectively.

Material

H.M.S. "Vanguard."—Princess Elizabeth on 12th May attended the commissioning service at Greenock of the battleship "Vanguard," which she launched in 1944. The ship is being prepared for the voyage to South Africa early in 1947 with the King and Queen and the Princesses Elizabeth and Margaret. In the House of Commons on 10th April, the Financial Secretary, Admiralty, stated that the total cost of the "Vanguard," including the value of the gun mountings already available, expenditure necessary for their modernisation and adaptation, and the cost of all guns and armament stores, is estimated to be approximately £11,000,000.

Corvettes for Eire.—H.M. ships "Belwort," "Borage" and "Oxlip," corvettes of the "Flower" class, were purchased in May by the Government of Eire.

Future of Portsmouth.—Admiral Sir Geoffrey Layton, Commander-in-Chief at Portsmouth, told the Portsmouth Chamber of Commerce on 13th May that the port would continue to be the main centre for naval training, with more naval men than before the War. The "Vernon" Torpedo and Mining School, was to be rebuilt, and the "Excellent" Gunnery School, the Submarine Depot, and the M.T.B. Base were to be reconditioned to modern standards. The "Collingwood" would become the permanent school for radar and electrical training, and a new Signal School would be built on Portsdown Hill. A new centre had sprung up as the Navigation School at Southwick Park.

NAVAL AIR BRANCH.—Rear-Admiral Charles Lambe, Assistant Chief of Naval Staff (Air), speaking at the first reunion dinner of No. 854 Naval Air Squadron in London on 22nd June, said the Air Branch of the Navy was likely to represent one-third of all naval man-power. As all the Navy's aircraft carriers could not be kept in commission, the Admiralty envisaged organizing 25 reserve air squadrons.

WITHDRAWAL FROM ALEXANDRIA.—The Alexandria Correspondent of *The Times* reported on 3rd July that H.M.S. " Nile," the shore establishment at Ras-el-Tin Point, which had been the British naval headquarters at this base from the outbreak of war in 1939, was closing down before being handed over to the Egyptian authorities at the end of July.

MISCELLANEOUS

A White Paper (Cmd. 6853), issued on 27th June, gives details of every enemy submarine losses during the War.

The Admiralty have arranged for the large map showing the positions of ships in the invasion fleet on D-Day to be permanently preserved at the Navigation School, Portsmouth.

The Chancellor of the Exchequer announced on 9th April that legislation would be introduced terminating the pension to the heirs of the brother of Horatio, Lord Nelson, on the death of the present Earl or of his heir—his brother, should the latter survive him. The bill will also provide for releasing the Trafalgar Estate from certain of the statutory restrictions imposed by the Act of 1806.

WOMEN'S ROYAL NAVAL SERVICE

The Admiralty announced on 4th July that there are now vacancies in the clerical and technical branches of the W.R.N.S. for volunteers. Those accepted must sign an engagement to serve for three years. Details can be obtained from any W.R.N.S. recruiting office, or direct from the Admiralty, Queen Anne's Mansions, S.W.1.

ROYAL MARINES

PROMOTIONS.—Major-General R. A. D. Brooks, C.B., C.M.G., D.S.O., to be Lieutenant-General (30th April, 1946); Colonel Commandant (temporary Brigadier, acting Major-General) H. T. Newman, C.B.E., A.D.C., to be Major-General (30th April, 1946).

OFFICERS' PAY.—Revised pay rates for Royal Marine officers on the General List have now been settled, and were announced in a written answer in Parliament in May. The pay will continue to be related to that of officers of the Royal Navy, as it would not be equitable to equate the pay of one isolated Royal Marine rank with the pay of an Army officer of the same title. The new rates a day are as follows :—

General	160s. od.	Captain	32s. od.
Lieutenant-General	135s. od.	,, biennial increments to	42s. od.
Major-General	110s. od.	Lieutenant	13s. od.
Colonel	74s. od.	Lieutenant after 4 years ...	17s. od.
Colonel at two years ...	77s. od.	,, biennial increments to ...	26s. od.
Lieutenant-Colonel	65s. od.	Second Lieutenant	7s. 6d.
,, biennial increments to	71s. od.	,, ,, over 20 ...	11s. od.
Major	47s. od.		
,, biennial increments to	57s. od.		

DOMINIONS AND COLONIES

AUSTRALIA

THANKS TO PACIFIC FLEET.—The Commonwealth Prime Minister, Mr. Chifley, sent a message to Admiral Sir Bruce Fraser on the occasion of the latter's relief in command of the British Pacific Fleet in June by Vice-Admiral Sir Denis Boyd, expressing the Government's appreciation of his successful leadership and the part played by the Fleet in the defeat of Japan and in the many tasks allotted to it since the end of the War. Mr. Chifley added that the co-operation of the Royal Navy and the Royal Australian Navy is of great value to Australia, and a source of satisfaction to the Government.

H.M.A.S. "SHROPSHIRE."—Sir Charles Grant, with a deputation from the London Shropshire Society, visited the cruiser "Shropshire" at Portsmouth on 28th June. He presented to the Australian Government, for use in the ship, a silver salver, coffee pot, and jug, originally given to the "Shropshire" from the county. On behalf of The King's Shropshire Light Infantry, he presented a silver bugle to the ship, and said that all her officers and men had been made honorary members of the regiment.

GEORGE CROSS.—It was announced on 30th April that the King had approved the award of the George Cross to—

Lieutenant George Gosse, R.A.N.V.R. (N. Adelaide, Australia).

On the 8th May, 1945, divers searching Ubersee Hafen reported the presence of a mine, which from their description appeared to be an entirely new type. Lieutenant Gosse immediately dived and verified the fact that it was a GD pressure type, which was commonly known as "oyster." As it was very necessary that this type of mine should be recovered intact, it was decided to attempt to render safe the mine underwater, and on the following day Lieutenant Gosse dived on it again. Using improvised tools, he eventually succeeded in removing the primer; this was followed by a loud metallic crash. The mine was eventually lifted on the quayside, when it was found that the detonator had fired immediately the primer had been removed. During the subsequent ten days, Lieutenant Gosse rendered safe two similar types of mines which were lying in close proximity to shipping, and in each instance the detonator fired before the mine reached the surface.

This officer displayed courage and zeal far in excess of the usual course of duty and contributed greatly to the success of a most difficult and important operation.

CANADA

NEWFOUNDLAND BASES.—A statement tabled on behalf of the Prime Minister in the Canadian House of Commons on 8th May, showed that Canada, Great Britain and Newfoundland had concluded an agreement for the use of defence installations in Newfoundland. It was indicated that the strategic importance of Newfoundland had been greatly exhanced by developments in air warfare and air navigation, and some continuing arrangements for defence of the territory were essential. The agreement provides that control of the air bases at Gander, Gleneagles and Botwood is to be handed back to Newfoundland in accordance with the original understanding. In the event of an outbreak of war involving Newfoundland and Canada, Canada may take over control of Gander airport for the duration of hostilities. Canada will continue to operate Torbay airport as a civil airport for the Newfoundland-Canada service, and may use it for military purposes as required.

BIRTHDAY HONOURS.—The following were awarded the C.B.E. in the King's Birthday honours on 13th June:—

Captain J. C. I. Edwards, R.C.N.
Captain R. E. S. Bidwell, R.C.N.

NEW ZEALAND

BIRTHDAY HONOUR.—Commander Ralph Newman, D.S.O., V.D., R.N.Z.N.V.R., was awarded the C.B.E. in the King's Birthday honours on 13th June.

INDIA

The King has been pleased to approve the appointment of Vice-Admiral Sir Geoffrey J. A. Miles, K.C.B., as Deputy Commander-in-Chief in India, from 2nd June, 1946. Sir Geoffrey Miles was in March appointed Flag Officer Commanding, Royal Indian Navy.

FOREIGN NAVIES

FRANCE

NAVAL BUDGET.—By the law of 5th April, 1946, the French Navy is granted 9,500,000,000 francs (9,5 milliards). This will allow 45,000 men to be maintained, though 60,000 are required for permanent establishment.

This reduced budget will necessitate cutting down shore establishments to the minimum, and disarming ships of small tonnage and obsolete classes. This will leave a force to fulfil international commitments of which the nucleus will be :—

1 battleship—the " Richelieu."
2 aircraft-carriers—including the " Colossus," lent by the Royal Navy for one year.
2 cruisers—7,000 tons.
2 light cruisers.
2 ex-German destroyers.

The rest of the money available should be spent on training establishments. It is realised that, while a fleet can be built in a few years, it takes more than ten years to produce the necessary trained personnel to man it.

French merchant shipping commandeered by the Allies in the War is being returned.

Minesweeping is progressing well. Since the end of 1945, 14,000 square kilometres and 26,000 mines have been swept.

BATTLESHIPS.—The only modern battleship, completed and in commission, is the " Richelieu," a striking aerial photograph of which appears in the Addenda pages of the 1944–45 *Jane's Fighting Ships*. This ship was extensively refitted in the U.S. Navy Yard, New York, during the War. Her main armament of eight 15 in. guns in two quadruple turrets, mounted forward, remains the same, as does the secondary armament of nine 6 in. in three triple turrets—all of which can fire right astern. The A.A. armament has been increased to twelve 3.9 in. A.A., 56 Bofors, and 50 Oerlikons.

A sister ship, the " Jean Bart," which lay at Casablanca for most of the War, is not yet completed.

The hull of a third ship, the " Clemenceau," was sunk by Allied bombs at Brest.

GERMANY

U-BOAT TYPES.—An article on " Les Sous-Marins Allemands," by Henri Le Masson, which appeared in the January, 1946, edition of *Science et Vie* gives some interesting particulars of the various types of U-boats and their functions. The following is a short summary :—

Type II.—250 tons. Used for training and short Baltic and North Sea cruises. Also sent overland to the Black Sea. Single hull (i.e. interior ballast).

Type VII.—517 tons. The most generally used. Four fifths of the flotillas were composed of this type. Displacement moderate, but endurance increased by supply submarines. Saddle tanks, i.e. ballast carried outside thick hull. 15 torpedoes, two 37 mm. A.A., one twin Oerlikon, one rocket projector for use against low-flying aircraft or eight 20 mm.

Type IX.—(*a*) 740 tons and (*b*) 1,200 tons. Introduced in June, 1938. Double hull with ballast between. Used in the Indian Ocean and European waters where aerial opposition was less in evidence. 50 per cent. more storage space. Range 20,000 miles. 740 ton class had 23 torpedoes ; 1,200 ton class had 27 torpedoes and one 105 mm. gun.

Special anti-aircraft submarines of the 1,200 ton type were employed to escort U-boats while passing through areas where they were particularly subject to air attack. They were armed with one 88 mm. and one 37 mm. A.A. gun and 12 Oerlikons.

Type XB.—(*a*) 1,600 tons (minelaying): First laid down in 1940. Previously mines had been laid from the torpedo tubes. 66 mines carried.

(*b*) 740 ton submarine carrying 36 mines.
(*c*) 517 ton submarines carrying 18 mines.

The mines were of the magnetic type, had a charge of 350 kg., and could be laid in a depth of up to 800 metres.

Type XIV.—1,600 tons (supply). Carrying stores, workshop, hospital. Armed with six 20 mm. and four machine guns. Capable of maintaining 10 to 15 fighting submarines.

Type XXI.—1,600. Came into service in Autumn, 1944; pre-fabricated. Submerged speed increased to 15–16 knots, speed of diving increased to 25 seconds. Radius of action increased: able to dive to over 300 metres.

Type XXIII.—230 tons (coastal). Came into service in Autumn, 1944. Submerged speed 10 to 12 knots; carried two torpedoes or two mines.

The following features were ultimately common to all types of U-boats:—

Torpedoes.—533 mm., pneumatic firing controlled hydraulically.

(NOTE: The Acoustic type came into service in September, 1943, but being delicate instruments not every U-boat could carry them.)

Gun Armament.—88 mm. or 105 mm.

Propulsion.—Diesel for surface; electric motors when submerged.

Radio.—Very well equipped from all points of view; anti-radar and anti-asdic apparatus carried.

Schnorkel.—8 to 10 m. long; 30 to 40 cm. in diameter. It enabled submarines to stay submerged for several days and to maintain a speed of at least seven knots when submerged.

JAPAN

DESTRUCTION OF WARSHIPS.—The Japanese Government have been given orders that by 30th April, 1947, all remaining ships of the former Imperial Navy larger than destroyers are to be scrapped. Ships excepted for the present are those in use by the occupation forces or in repatriation services. Eight carriers, light carriers, escort carriers, and cruisers —totalling about 100,000 tons are to be scrapped immediately; all have been damaged "beyond economical repair for repatriation use." The other warships, now being used by the Allies, will probably be available for scrapping in November.

UNITED STATES

CARRIERS MANŒUVRED BY AIRCRAFT.—It has been found that even the largest carriers can be turned in their own length or moved sideways by the airscrews of stationary aircraft secured at suitable places on the flying deck. Moored at the bow and stern ends, the aircraft propellers revolving at high speed produce a powerful turning force. If a number are lined up on one beam, they provide a sideways pull and movement of the carrier.

This system was first used by Captain Felix L. Baker, U.S.N., commanding the U.S.S. "Randolph," when the ship was lying off Guam in June, 1945, and harbour congestion and shoals prevented turning under her own power and no regular tugs were available.

It is stated that the 45,000 ton carrier, "Midway," uses 32 aircraft as air tugs.

ARMY NOTES

H.M. The King

The King and Queen, accompanied by The Princess Elizabeth and The Princess Margaret, visited contingents of Overseas Troops in Kensington Gardens on 6th June.

The Queen (Colonel-in-Chief) was present at an At Home given by the officers of The King's Own Yorkshire Light Infantry in London on 14th June. Her Majesty was present at a Passing-out Parade at the Royal Military College, Sandhurst, on 5th July.

The Queen (Honorary Colonel) was present at a Rally of The Hertfordshire Regiment at Hertford on 21st July.

The Princess Royal, Colonel-in-Chief, visited the 4th Battalion, The Canadian Scottish at Milford on 6th May.

The Princess Royal, Colonel-in-Chief, inspected the Victory Parade units of the Royal Corps of Signals and of the Dominion, Indian and Colonial Corps of Signals in London on 3rd June.

She was present at an afternoon party given by the Royal Signals in London on 11th July.

On 12th July she attended the Royal Signals War Memorial Service in St. Martin's-in-the-Fields, Trafalgar Square.

On 17th July she was present at a Reception at the American Embassy, when a plaque was presented to the Royal Signals, on behalf of the United States Signal Corps.

The Princess Royal, Controller-Commandant, visited No. 2 M.T. Training Centre, Auxiliary Territorial Service, at Gresford on 28th May.

On 29th May she visited the C.O.D. Group, A.T.S., at Donnington.

On 4th June she visited the A.T.S. Victory Camp, Bushey Park.

She attended staff conferences of the A.T.S. in London on 6th June and 17th July, and at York on 26th June.

The King has approved the following appointments :—

To be Aides-de-Camp to the King.—Colonel (temporary Brigadier) E. W. D. Vaughan, D.S.O., M.C., I.A. (15th June, 1945); Colonel (temporary Major-General) B. W. Key, D.S.O., M.C., I.A. (14th August, 1945); Colonel (temporary Major-General) F. W. H. Pratt, C.B.E., D.S.O., M.C. (29th May, 1946).

To be Hon. Surgeon to the King.—Colonel (temporary Brigadier) A. E. Richmond, C.B.E., late R.A.M.C. (20th June, 1946).

To be Colonels Commandant—of the Royal Engineers, Lieut.-General Sir Gordon N. MacReady, Bt., K.B.E., C.B., C.M.G., D.S.O., M.C. (13th May, 1946) and Major-General (Hon. Lieut.-General) Sir Charles J. S. King, K.B.E., C.B. (26th June, 1946); of the Army Physical Training Corps, Field-Marshal the Viscount Montgomery of Alamein, G.C.B., D.S.O. (1st May, 1946); of the Royal Army Medical Corps, Major-General O. W. McSheehy, C.B., D.S.O., O.B.E., M.B. (30th June, 1946).

To be Regimental Colonels—of The Royal Scots Fusiliers, Major-General E. Hakewill-Smith, C.B., C.B.E., M.C. (1st May, 1946); of The Royal Norfolk Regiment, Major-General H. P. M. Berney-Ficklin, C.B., M.C. (1st May, 1946); of The East Surrey Regiment, Major-General A. A. B. Dowler, C.B. (1st July, 1946).

Hon. Lieut.-General H. H. Maharaja Sir Padma Shumshere Jung Bahadur Rana, Prime Minister and Supreme Commander-in-Chief of Nepal, has been appointed Honorary Colonel of all the Gurkha Regiments in the Indian Army.

Army Council

The King has been pleased by Letters Patent under the Great Seal bearing date 26th June, 1946, to appoint the following to be His Majesty's Army Council :—

The Right Hon. J. J. Lawson, President.

Colonel H. L. B. Nathan, T.D., Vice-President.

Field-Marshal Viscount Montgomery of Alamein, G.C.B., D.S.O.

General Sir Richard N. O'Connor, K.C.B., D.S.O., M.C.

Lieut.-General Sir Daril G. Watson, K.C.B., C.B.E., M.C.

Major-General (acting Lieut.-General) F. E. W. Simpson, C.B., D.S.O.

Major-General (temporary Lieut.-General) Sir Sidney C. Kirkman, K.B.E., C.B., M.C.

Captain F. J. Bellenger.

Sir Eric B. B. Speed, K.C.B., K.B.E., M.C.

Honours and Awards

Victoria Cross

The King has approved the award of the Victoria Cross to *Guardsman E. C. Charlton*, Irish Guards (posthumous)—for superbly brave and self-sacrificing action against the enemy in Germany on 21st April, 1945.

George Cross

The King has approved the award of the George Cross, in recognition of most conspicuous gallantry in carrying out hazardous work in a very brave manner, to *Captain Mahmood Khan Durrani*, 1st Bahawalpur Infantry, Indian State Forces.

The following awards were included in those announced on 23rd May in recognition of distinguished services in South-East Asia :—

K.C.I.E.—Major-General C. R. C. Lane, C.B., C.B.E., M.C.

K.B.E.—Major-General (temporary) R. F. S. Denning, C.B. ; Lieut.-General (temporary) H. E. de R. Wetherall, C.B., D.S.O., O.B.E., M.C.

C.B.—Major-General (temporary) D. Harrison, D.S.O.

The following awards were including in those announced on 6th June in recognition of gallant and distinguished services in Burma :—

C.B.—Major-Generals (temporary) G. C. Evans, C.B.E., D.S.O., and F. W. Festing, C.B.E., D.S.O., and H. E. Pyman, C.B.E., D.S.O., and R. H. R. Steward, C.B.E., D.S.O., M.C., and G. N. Wood, C.B.E., D.S.O., M.C. ; Major-Generals (acting) C. Hawthorn, D.S.O., and H. E. Rance, O.B.E., and H. C. Stockwell, C.B.E., D.S.O., and W. E. Tyndall, C.B.E., M.C., M.B. ; Brigadier (temporary) W. O. Bowen, C.B.E.

The following awards were included in the King's Birthday Honours List published on 13th June :—

O.M.—Field-Marshal Viscount Alanbrooke, G.C.B., D.S.O.

G.C.B.—General Sir Hastings L. Ismay, C.H., K.C.B., D.S.O.

K.C.B.—Lieut.-General Sir Arthur F. Smith, K.B.E., C.B., D.S.O., M.C. ; Lieut.-General (acting) R. M. M. Lockhart, C.B., C.I.E., M.C., Indian Army.

K.C.S.I.—Major-General (local Lieut.-General) G. Wilson, C.B., C.B.E., M.C., K.H.S., late R.A.M.C.; General A. R. Godwin-Austen, C.B., O.B.E., M.C.

K.C.I.E.—Major-General (temporary Lieut-General) K. M. Loch, C.B., M.C. ; Major-General H. E. Roome, C.B., C.B.E., M.C.

K.B.E.—Lieut.-General (temporary) C. W. Allfrey, C.B., D.S.O., M.C.; Lieut.-General (acting) J. S. Steele, C.B., D.S.O., M.C.; Lieut.-General (local) P. Neame, V.C.,

C.B., D.S.O.; Major-Generals A. G. Biggam, C.B., O.B.E., M.D., F.R.C.P., late R.A.M.C., and E. M. C. Clarke, C.B., C.B.E., and A. A. B. Dowler, C.B., and E. I. C. Jacob, C.B., C.B.E., B.A., and H. R. Kerr, C.B., O.B.E., M.C., and L. G. Phillips, C.B., C.B.E., M.C., and E. B. Rowcroft, C.B., C.B.E., M.I.Mech.E., M.I.E.E.; Brigadier (local) H. W. B. Cairns, F.R.C.S., Royal Army Medical Corps.

C.B.—Lieut.-General (temporary) C. H. Gairdner, C.B.E.; Lieut.-General (acting) H. R. Briggs, C.B.E., D.S.O., I.A.; Major-Generals N. Cantlie, M.C., M.B., F.R.C.S., late R.A.M.C., and G. Cheetham, D.S.O., M.C., and D. V. O'Malley, O.B.E., M.B., Indian Medical Service; Major Generals (temporary) W. H. A. Bishop, O.B.E., and J. C. A. Dowse, C.B.E., M.C., M.B., late R.A.M.C., and E. C. Hayes, and R. P. L. Ranking, C.B.E., M.C., I.A., and C. S. Sugden, C.B.E., and J. N. Thomson, D.S.O., M.C., A.D.C., and D. A. L. Wade, O.B.E., M.C., and T. N. F. Wilson, D.S.O., M.C., and T. J. W. Winterton, C.B.E.; Major-Generals (acting) B. C. H. Kimmins, C.B.E., and R. S. Lewis, O.B.E., and L. M. Maltby, M.C., I.A.; Brigadiers (temporary) H. S. Scott-Barrett, C.B.E., T.D., and J. E. C. McCandlish, C.B.E., and R. S. G. T. Ransome, C.B.E., M.C.; Colonel J. C. d'Arcy, C.B.E., M.C.; Colonel (local) B. C. Hartley, O.B.E.

Appointments

War Office.—Brigadier R. T. Ransome, C.B., C.B.E., M.C., Director of Administrative Planning, has been appointed Vice-Quartermaster-General, with the acting rank of Major-General.

General Sir Richard N. O'Connor, K.C.B., D.S.O., M.C., has succeeded General Sir Ronald Adam, G.C.B., D.S.O., O.B.E., as Adjutant-General to the Forces.

Major-General C. G. G. Nicholson, C.B., C.B.E., D.S.O., M.C., has been appointed Director, Royal Artillery.

Lieut-General Sir Frederick Browning, K.B.E., C.B., D.S.O., is to become Military Secretary to the Secretary of State for War in September.

British Army of the Rhine.—Major-General P. M. Balfour, C.B., C.B.E., M.C., has been appointed Director, Civil Affairs, Military Government, B.A.O.R.

Mission to France.—Brigadier A. G. Salisbury-Jones, C.B.E., M.C., has been appointed head of the British Military Mission in France and Military Attaché, Paris, with acting rank of Major-General.

Mission to Egypt.—Temporary Major-General R. K. Arbuthnott, C.B., C.B.E., D.S.O., M.C., has been appointed Head of Mission to the Egyptian Army (1st July, 1946).

78th Division.—Brigadier J. F. B. Combe, D.S.O., has been appointed Commander, 78th Division, with acting rank of Major-General.

Great Britain.—Temporary Major-General H. C. Stockwell, C.B.E., D.S.O., has been appointed Commander, Home Counties District, Eastern Command.

Temporary Major-General C. M. Barber, C.B., D.S.O., has been appointed Commander, Highland District, Scottish Command.

Acting Major-General J. B. Churcher, D.S.O., has been appointed Commander, Northumbrian District, Northern Command.

Chief Royal Engineer.—General Sir Guy C. Williams, K.C.B., C.M.G., D.S.O., has been appointed Chief Royal Engineer (26th June, 1946).

Anti-Aircraft Command.—Major-General O. M. Lund, C.B., D.S.O., has been appointed G.O.C.-in-C., Anti-Aircraft Command, with acting rank of Lieut.-General (1st May, 1946).

India.—Colonel (acting Major-General) B. W. Key, D.S.O., M.C., I.A., has been appointed Commander, Rawalpindi District (15th April, 1946).

Middle East.—Major-General K. G. McLean, C.B., has been appointed Deputy Adjutant-General, G.H.Q., Middle East.

Promotions

The following promotions have been announced :—

Field-Marshal.—To be Field-Marshal : General Sir Claude J. E. Auchinleck, G.C.B., G.C.I.E., C.S.I., D.S.O., O.B.E., Indian Army (1st June, 1946).

Generals.—The following Lieut.-Generals to be Generals :—Sir Edwin L. Morris, K.C.B., O.B.E., M.C. (8th April, 1946) ; A. R. Godwin-Austen, C.B., O.B.E., M.C. (1st May, 1946) ; Sir Geoffrey A. P. Scoones, K.B.E., C.S.I., D.S.O., M.C., I.A. (15th April, 1946).

The following Lieut.-General to be acting General :—Sir Miles C. Dempsey, K.C.B., K.B.E., D.S.O., M.C. (28th June, 1946).

Lieut.-Generals.—The following Major-Generals (temporary Lieut.-Generals) to be Lieut.-Generals :—A. R. Godwin-Austen, C.B., O.B.E., M.C. (29th March, 1946, with seniority 5th January, 1943) ; Sir Arthur F. Smith, K.B.E., C.B., D.S.O., M.C. (8th April, 1946, with seniority 8th June, 1943) ; Sir Brian H. Robertson, Bt., K.C.V.O., C.B., C.B.E., D.S.O., M.C. (1st May, 1946, with seniority 12th September, 1944) ; Sir Evelyn H. Barker, K.B.E., C.B., D.S.O., M.C. (5th May, 1946, with seniority 13th September, 1944) ; Sir Frederick A. M. Browning, K.B.E., C.B., D.S.O. (9th May, 1946), with seniority 23rd December, 1944).

The following Major-Generals (acting Lieut.-Generals) to be temporary Lieut.-Generals :—Sir W. Wyndham Green, K.B.E., C.B., D.S.O., M.C. (16th April, 1946) ; J. F. Evetts, C.B., C.B.E., M.C. (15th May, 1946).

The following Major-Generals to be acting Lieut.-Generals :—O. M. Lund, C.B., D.S.O. (1st May, 1946) ; R. A. Savory, C.B., D.S.O., M.C., I.A. (15th March, 1946) ; D. Russell, C.B., C.B.E., D.S.O., M.C., I.A. (5th May, 1946).

Major-Generals.—The following Colonels (temporary or acting Major-Generals) to be Major-Generals :—J. C. Heydon, D.S.O., O.B.E. (20th March, 1946, with seniority 31st July, 1944) ; M. W. M. MacLeod, C.B., C.B.E., D.S.O. (8th April, 1946, with seniority 10th August, 1944) ; R. F. S. Denning, C.B. (30th April, 1946, with seniority 11th August, 1944) ; E. Hakewill-Smith, C.B., C.B.E., M.C. (1st May, 1946, with seniority 21st August, 1944) ; R. W. Galloway, C.B., C.B.E., D.S.O., M.B., late R.A.M.C. (20th June, 1946) ; J. A. Sinclair, C.B., O.B.E. (5th May, 1946, with seniority 25th August, 1944) ; C. E. Loewen, C.B., C.B.E., D.S.O. (6th May, 1946, with seniority 30th August, 1944) ; L. O. Lyne, C.B., D.S.O. (9th May, 1946, with seniority 2nd September, 1944) ; M. E. Dennis, C.B., C.B.E., D.S.O., M.C. (16th May, 1946, with seniority 14th September, 1944) ; W. F. Hasted, C.B., C.I.E., C.B.E., D.S.O., M.C. (19th May, 1946, with seniority 18th September, 1944).

The following Colonel to be Major-General :—W. Foot, M.C., M.B., late R.A.M.C. (27th May, 1946).

The following Colonels (acting Major-Generals) to be temporary Major-Generals :—W. D. Stamer, C.B.E., D.S.O., M.C. (15th May, 1946) ; R. S. Lewis, O.B.E., I.A. (5th January, 1946) ; W. F. Hasted, C.I.E., C.B.E., D.S.O., M.C. (1st July, 1946).

The following Lieut.-Colonels (acting Major-Generals) to be temporary Major-Generals :—S. B. Rawlins, C.B., C.B.E., D.S.O., M.C. (30th March, 1946) ; D. R. E. R. Bateman, D.S.O., O.B.E., I.A. (8th November, 1945) ; L. A. Loup, C.B.E., I.A. (7th August, 1945) ; H. M. Chambers, I.A. (1st April, 1946) ; M. Glover, O.B.E., I.A. (20th October, 1945) ; A. J. H. Cassels, C.B.E., D.S.O. (28th May, 1946).

The following Colonels (temporary Brigadiers) to be acting Major-Generals :—A. G. Salisbury-Jones, C.B.E., M.C. (3rd May, 1946) ; J. F. B. Combe, D.S.O. (10th June, 1946).

The following Colonel to be acting Major-General :—E. B. Marsh, M.C., M.B., M.R.C.P., late R.A.M.C. (1st May, 1946).

The following Lieut.-Colonels (temporary Brigadiers) to be acting Major-Generals :—R. H. B. Arkwright, C.B., D.S.O. (1st April, 1946) ; R. St. G. T. Ransome, C.B.E., M.C. (15th May, 1946) ; A. B. Davies, O.B.E. (1st March, 1946).

Retirements

The following General Officers have retired :—Major-General Sir Guy de C. Glover, K.B.E., C.B., D.S.O., M.C. (24th April, 1946) ; General Sir Thomas S. Riddell-Webster, G.C.B., D.S.O. (27th April, 1946) ; Major-General R. H. Dewing, C.B., D.S.O., M.C. (6th May, 1946) ; Lieut.-General Sir James A. H. Gammell, K.C.B., D.S.O., M.C. (9th May, 1946) ; Major-General R. L. Bond, C.B., C.B.E., D.S.O., M.C. (16th May, 1946) ; Major-General C. H. Miller, C.B., C.B.E., D.S.O. (19th May, 1946) ; Major-General J. S. Crawford, C.B., C.B.E., M.I.Mech.E. (27th May, 1946) ; Major-General H. J. Manockjee Cursetjee, K.C.I.E., C.S.I. D.S.O., late I.M.S. (1st June, 1946) ; Major-General G. Wilson, C.B., C.B.E., M.C., M.B., late R.A.M.C. (20th June, 1946) ; Major-General V. H. B. Majendie, C.B., D.S.O. (16th July, 1946) ; Major-General H. E. de R. Wetherall, K.B.E., C.B., D.S.O., M.C., with hon. rank of Lieut.-General (3rd July, 1946) ; Major-General Sir W. Wyndham Green, K.B.E., C.B., D.S.O., M.C., with hon. rank of Lieut.-General (4th July, 1946) ; General Sir Ronald F. Adam, Bt., G.C.B., D.S.O., O.B.E. (15th July, 1946).

Voluntary Recruitment for the Army

The following are the main conditions affecting men who may volunteer for service in the Regular Army.

Normal Regular engagements.—Length of service : either five years with the Colours and seven years with the Reserve, or twelve years with the Colours with no Reserve liability. Subject to rules as to character, efficiency and medical fitness, soldiers may re-engage after twelve years service to complete twenty-two years service.

Eligibility : British subjects of unmixed European descent, between the ages of seventeen and a half and thirty.

Overseas service : the policy for the future is that the normal overseas tour will be from three to three and a half years, and the long-service soldier, serving twelve years with the Colours, will normally have about three years at home between his two foreign tours.

Short service engagements.—Length of service : three to four years with the Colours. No subsequent Reserve liability.

Eligibility : Men who have completed at least two years Colour service subsequent to 1st September, 1939 and are between the ages of thirty and forty.

Bounties : £25 as an initial bounty and £25 for each year of the short service engagement.

Despatches

Since the last issue of this Journal, a number of Despatches submitted to the Secretary of State for War by commanders during the late war have been published in the *London Gazette* :

France, 1940.—A Despatch dated 22nd June, 1940 from Lieut.-General Sir Alan Brooke, K.C.B., D.S.O., commanding II Corps, British Expeditionary Force, France, describing the operations of that force from 12th to 19th June, 1940, together with an Appendix describing the operations of the troops detached under Lieut.-General J. H. Marshall-Cornwall from 1st to 18th June, 1940, was published in the *London Gazette* of 22nd May, 1946.

Norway, 1940.—A Despatch, dated 13th May, 1940, from Lieut.-General H. R. S. Massy, D.S.O., M.C., describing the operations in Central Norway, 1940, was published in the *London Gazette* of 29th May, 1946.

Somaliland, 1939-40.—A Despatch, dated 12th September, 1940, from General Sir Archibald Wavell, K.C.B., C.M.G., M.C., Commander-in-Chief in the Middle East,

describing operations in the Somaliland Protectorate, 1939-40, was published in the *London Gazette* of 5th June, 1946.

MIDDLE EAST, 1939-40.—A Despatch dated 10th December, 1940 from General Wavell, describing operations in the Middle East from August, 1939 to November, 1940 was published in the *London Gazette* of 13th June, 1946.

WESTERN DESERT, WINTER, 1940-41.—A Despatch dated 21st June, 1941, from General Wavell, describing operations in the Western Desert from 7th December, 1940 to 7th February, 1941, was published in the *London Gazette* of 26th June, 1946.

MIDDLE EAST, FEBRUARY TO JULY, 1941.—A Despatch dated 5th September, 1941 from General Wavell, describing operations in the Middle East from 7th February, 1941 to 15th July, 1941, was published in the *London Gazette* of 3rd July, 1946. The operations described in this Despatch include those in Greece, Cyrenaica, Crete, Iraq and Syria, but not those in Italian East Africa.

EAST AFRICA.—A Despatch dated 21st May, 1942 from General Wavell on the campaign in East Africa from November, 1940 to July, 1941, covering the reports from Lieut.-General Sir William Platt (the invader through Eritrea) and Lieut.-General Sir Alan A. Cunningham (the invader through Italian Somaliland), was published in the *London Gazette* of 10th July, 1946. *The Times* issue of 11th July, contains an interesting review of this Despatch by the Military Correspondent of that newspaper.

EAST AFRICA COMMAND.—A Despatch dated 31st March, 1943 from Lieut.-General Sir William Platt, G.B.E., K.C.B., D.S.O., describing the operations of the East Africa Command, 12th July, 1941 to 8th January, 1943, was published in the *London Gazette* of 17th July, 1946.

MISCELLANEOUS

52ND DIVISION.—On 18th July, the 52nd (Lowland) Division's band of more than 150 pipers and drums marched through the principal streets of Berne to the federal palace, where they were welcomed by Federal Councillor Kobelt, head of the Swiss Military Department, and the principal Swiss military officers. Federal Councillors Staempfli and von Steiger were also present. The band gave a short performance before a large and delighted crowd before continuing their march through the thronged streets to the Rathaus, where they were welcomed by the city council.

ARAB LEGION AND THE HOUSEHOLD CAVALRY.—At Windsor Cavalry Barracks on 1st June, a contingent of the Arab Legion presented to the Household Cavalry a standard, the gift of Brigadier Glubb, to commemorate the days when the Arab Legion and the Household Cavalry fought together in Iraq and Syria. All the members of the Arab Legion who attended had taken part in that fighting, as had the twenty members of the Household Cavalry who received the gift. The presentation was made by Major-General Abdel Kadir Pasha Jundi, and the standard was received on behalf of the Household Cavalry by Colonel R. E. S. Gooch.

After thanking the Arab Legion, Colonel Gooch handed Major-General Abdel Kadir Pasha Jundi two silver-chased trumpets inscribed: "Presented to the Arab Legion to commemorate the operations together in Iraq and Syria in 1941."

ARMY OFFICERS ART SOCIETY.—Reference to this Society was made in the May number of the JOURNAL in Army Notes (page 304). Any officer interested is invited to communicate with the Honorary Secretary, Colonel L. N. Malan, 10, Blenheim Road, London, N.W.8, who will send all particulars.

DOMINIONS

CANADA

HONOURS AND AWARD.—The following awards were included in the King's Birthday Honours list, published on 13th June:—

C.H.—General the Honourable A. G. L. McNaughton, C.B., C.M.G., D.S.O., General Officer Commanding-in-Chief, First Canadian Army, 1942-43.

C.B.—Major-General H. A. Young, C.B.E., D.S.O., Canadian Army.

NEW ZEALAND

HONOURS AND AWARDS.—The following award was included in the King's Birthday Honours list published on 13th June :—

C.B.—Major-General N. W. M. Weir, C.B.E., New Zealand Military Forces.

FOREIGN

CHINA

OCCUPATION OF JAPAN.—The Chinese Ministry of Information announced on 23rd May, that the Chinese 53rd Army under General Chou Fu-cheng, which fought in Yunnan and Northern Burma and had since been stationed temporarily in Indo-China, would embark at Haiphong in June to take part in the Allied occupation of Japan, landing at Yokohama and being allotted a zone of occupation by General MacArthur.

MINISTRY OF DEFENCE.—It was announced on 23rd May, that the Ministry of War and the National Military Council would be merged into a single Ministry of National Defence, representing all the three Services, under General Pai Tsung-chi.

AIR NOTES

GREAT BRITAIN

H.M. The King

Air Marshal Sir Roderic M. Hill, K.C.B., M.C., A.F.C., has been appointed Principal Air Aide-de-Camp to the King, in succession to Air Chief Marshal Sir Edgar R. Ludlow-Hewitt, G.C.B., G.B.E., C.M.G., D.S.O., M.C. (retired), to date 4th May, 1946.

Air Vice-Marshal Kenneth Biggs, C.B.E., M.C., has been appointed Honorary Physician to the King, in succession to Air Marshal Sir Harold E. Whittingham, K.C.B., K.B.E., LL.D., who vacated the appointment on retirement from the R.A.F., 26th April, 1946.

The Air Council

Lord Stansgate, Secretary of State for Air, left Northolt on 5th July to return to Egypt to continue the negotiations with the Egyptian Government on which he had been engaged in recent months.

Air Chief Marshal Sir Douglas Evill relinquished the appointment of Vice-Chief of the Air Staff and Additional Member of the Air Council on 1st June, on retirement from the R.A.F. He was succeeded by Air Vice-Marshal (acting Air Marshal) Sir William F. Dickson, who was succeeded as Assistant Chief of the Air Staff (Policy) by Air Vice-Marshal Sir William Elliott, formerly Assistant Chief Executive, Ministry of Supply and Aircraft Production.

The Air Ministry announced on 30th May that with the contraction of the Royal Air Force from its war-time strength, the Air Staff had been reduced and reorganized. The post of Deputy Chief of the Air Staff, which had been held since September, 1945, by Air Marshal Albert Durston, was being discontinued with effect from 1st June.

Appointments

Marshal of the Royal Air Force Sir Sholto Douglas arrived at Gatow airport, Berlin, on 1st May to assume the duties of Commander-in-Chief of the British Army of the Rhine and Military Governor, in succession to Field Marshal Lord Montgomery.

The following appointments were announced on the dates stated :—

1st May, 1946.—Air Marshal Sir George C. Pirie to be Air Commander-in-Chief, Headquarters, Air Command, South-East Asia, to succeed Air Chief Marshal Sir Keith Park, from 30th April.

10th May, 1946.—Air Vice-Marshal Somerled D. Macdonald to be Air Officer Commanding No. 11 Group, R.A.F. Fighter Command.

11th May, 1946.—Air Vice-Marshal Ronald Graham to be Air Officer Commanding, R.A.F. Mission to Australia and New Zealand, and R.A.F. Member of the Joint Chiefs of Staff, Australia.

Air Vice-Marshal Hugh S. P. Walmsley to be Air Officer Commanding, No. 232 Group, Air Command, South-East Asia.

Air Vice-Marshal Sydney E. Toomer to be Air Officer Commanding, No. 219 Group, Mediterranean and Middle East Command.

Air Vice-Marshal Percy E. Maitland to be Air Officer Commanding, No. 84 Group, British Air Forces of Occupation (Germany).

16th May, 1946.—Air Vice-Marshal Robert M. Foster to be Air Officer Commanding, Air Headquarters, Italy. (See also 4th July and 6th July.)

Air Vice-Marshal Edgar J. Kingston-McCloughry to be Senior Air Staff Officer, Air Headquarters, India.

Air Vice-Marshal Robert L. Ragg to be Air Officer in Charge of Administration, Air Headquarters, India.

21ST MAY, 1946.—Air Vice-Marshal Thomas C. Traill to be Air Officer Commanding, No. 12 Group, Fighter Command.

22ND MAY, 1946.—Air Vice-Marshal Ernest J. Cuckney to be Deputy Controller of Research and Development, Ministry of Supply; and Air Vice-Marshal Robert Owen Jones to be Head of a Planning Staff formed to consider the future control and direction of technical services in the R.A.F.

23RD MAY, 1946.—Air Vice-Marshal Sir Alan Lees to be Air Officer Commanding-in-Chief, Reserve Command. Sir Alan Lees has been directing the arrangements for the re-establishment of auxiliary and reserve forces since August, 1945. In February, 1946, he also became Chief Commandant and Director-General of the Air Training Corps, an appointment which he retains.

4TH JUNE, 1946.—Air Chief Marshal Sir Philip Joubert, whose retirement from the active list was announced last December, has been appointed Director of Public Relations of the Air Ministry, in succession to Air Commodore Lord Willoughby de Broke.

20TH JUNE, 1946.—Air Vice-Marshal Hugh S. P. Walmsley to be Air Officer in Charge of Administration, Air Headquarters, India.

Air Vice-Marshal Anthony L. Paxton to be Air Officer Commanding, No. 2 Group, British Air Forces of Occupation (Germany).

4TH JULY, 1946.—Air Vice-Marshal John W. Baker to be Director-General of Personnel (1), Air Ministry.

Air Vice-Marshal Francis J. Fogarty to be Air Officer in Charge of Administration, R.A.F. Headquarters, Mediterranean and Middle East.

Air Vice-Marshal Lawrence Darvall to be Air Officer Commanding, Air Headquarters, Italy.

Air Commodore Andrew MacGregor to be Air Officer in Charge of Administration, Headquarters, Fighter Command, with the acting rank of Air Vice-Marshal.

Air Vice-Marshal R. M. Foster, whom it was announced in May had been appointed A.O.C., Air Headquarters, Italy, is returning to England for an appointment at home.

6TH JULY, 1946.—Air Vice-Marshal Robert M. Foster to be Air Officer Commanding, No. 3 Group, Bomber Command.

The organization of the Ministry of Civil Aviation was regraded in accordance with that of a first class Department of State with effect from 1st April. Among appointments approved as a consequence of this change were :—

Chief Aeronautical Adviser, Air Chief Marshal Sir Frederick W. Bowhill.

Director-General of Technical Services, Air Vice-Marshal Alfred C. Collier.

The appointment of four civilian commissioners, to replace corps commanders of the Rhine Army, was announced in the House of Commons on 10th May as a further step towards the civilianization of the Control Commission in Germany. Among them was the appointment of Air Vice-Marshal Hugh Champion de Crespigny as Regional Commissioner for Schleswig-Holstein.

The Minister of Supply announced on 5th June that Air Commodore Frank Whittle, the designer of the jet engine, will continue in the service of the Ministry as Technical Adviser on Engine Design and Production to the Controller of Supplies (Air).

PROMOTIONS

Air Commodore (temporary Air Vice-Marshal) A. F. Rook, C.B., O.B.E. (Medical Branch), to be Air Vice-Marshal (1st July, 1946).

Grant of Acting Rank.—Air Commodore E. J. Kingston-McCloughry, C.B.E., D.S.O., D.F.C., as Air Vice-Marshal (1st April, 1946).

Air Commodore A. MacGregor, C.B.E., D.F.C., as Air Vice-Marshal (4th July, 1946).

Retirements

Air Vice-Marshal (temporary Air Marshal) Sir Richard H. Peck, K.C.B., O.B.E., retaining the rank of Air Marshal (2nd April, 1946).

Air Marshal Sir Harold E. Whittingham, K.C.B., K.B.E., LL.D. (Medical Branch) (26th April, 1946).

Air Commodore (temporary Air Vice-Marshal) R. Harrison, C.B., C.B.E., D.F.C., A.F.C., retaining the rank of Air Vice-Marshal (25th April, 1946).

Air Commodore M. Thomas, C.S.I., C.B.E., D.F.C., A.F.C., retaining the rank of Air Vice-Marshal (18th April 1946).

Reversion to Retired List.—Air Vice-Marshal (acting Air Marshal) Sir E. Leslie Gossage, K.C.B., C.V.O., D.S.O., M.C., at own request, resuming the rank of Air Marshal (seniority, 1st January, 1943) (25th April, 1946).

Air Vice-Marshal J. J. Breen, C.B., O.B.E., retaining the rank of Air Marshal (2nd May, 1946).

Air Vice-Marshal R. D. Oxland, C.B., C.B.E. (10th May, 1946).

Air Vice-Marshal Sir A. Samuel Morris, K.B.E., C.B. (10th May, 1946).

Air Commodore M. L. Taylor, C.B.E., A.F.C., retaining the rank of Air Vice-Marshal (19th May, 1946).

Air Commodore J. R. Cassidy, C.B.E., retaining the rank of Air Vice-Marshal (27th May, 1946).

Air Commodore O. E. Carter, C.B.E., A.F.C., at own request, retaining the rank of Air Vice-Marshal (6th June, 1946).

Amendment.—Air Chief Marshal Sir Christopher L. Courtney, G.B.E., K.C.B., D.S.O., on account of medical unfitness for Air Force service (9th November, 1945) (substitution for notification of 22nd January, 1946).

Honours and Awards

Victoria Cross.—It was announced on 21st June that the King had approved the award of the Victoria Cross to :

Squadron Leader Arthur Stewart King Scarf (deceased), R.A.F., No. 62 Squadron.

On 9th December, 1941, all available aircraft from the R.A.F. station, Butterworth, Malaya, were ordered to make a daylight attack on the advanced operational base of the Japanese Air Force at Singora, Thailand. From this base the enemy fighter squadrons were supporting the landing operations. The aircraft detailed for the sortie were on the point of taking off when the enemy made a combined dive-bombing and low-level machine-gun attack on the airfield. All our aircraft were destroyed or damaged with the exception of the Blenheim, piloted by Squadron Leader Scarf, which had become airborne a few seconds before the attack started.

Squadron Leader Scarf had seen this disaster and it would have been reasonable had he abandoned the projected operation. He decided, however, to press on to Singora in his single aircraft because he appreciated the moral effect which it would have on the remainder of the squadron, who were helplessly watching their aircraft burning on the ground.

He completed his attack successfully. The opposition over the target was severe and included attacks by a considerable number of enemy fighters. In the course of these encounters he was mortally wounded. He fought a brilliant evasive action in a valiant attempt to return to his base. Although he displayed the utmost gallantry and determination he was, owing to his wounds, unable to accomplish this. He made a successful forced landing at Alor Star without causing any injury to his crew. He was received into hospital as soon as possible, but died shortly after admission.

Squadron Leader Scarf displayed supreme heroism in the face of tremendous odds.

George Cross.—It was announced on 20th April that the King had approved the award of the George Cross to Flight-Lieutenant Hector Bertram Gray, A.F.M., R.A.F. (deceased).

Whilst a prisoner of war in Japanese hands, Flight-Lieutenant Gray was one of a small group of officers and men engaged in organizing a general escape. The Japanese discovered the plan, and on 1st July, 1943, Flight-Lieutenant Gray and two non-commissioned officers were arrested. Two Army officers were arrested later.

He was interrogated on several occasions, starved, tortured and was finally brought before a Japanese Court Martial, where he was sentenced to death. He was subsequently shot.

As the first officer to be arrested, Flight-Lieutenant Gray bore the brunt of the torture inflicted by the Japanese. In spite of this, and the fact that he was suffering from illness when arrested and never recovered his health during the five months of his imprisonment, he steadfastly refused to implicate any others. His magnificent fortitude and courageous spirit in the face of torture remained unbroken to the last.

Birthday Honours

The following were among the honours conferred on the official celebration of the King's Birthday on 13th June :—

Baron.—Marshal of the Royal Air Force Sir Cyril Louis Norton Newall, O.M., Governor General and Commander-in-Chief of New Zealand, 1941-46.

C.B. (*Military*).—Air Vice-Marshals G. Combe, W. J. B. Curtis, A. P. Davidson, C. E. N. Guest, A. E. Panter, D. F. Stevenson, S. E. Toomer.

Air Commodores G. W. Birkinshaw, D. W. Clappen, T. Fawdry, R. G. Hart, W. Thorne, F. E. Vernon, C. McC. Vincent, G. P. Chamberlain.

Group Captain H. E. Nowell.

K.B.E. (*Military*).—Air Marshal Andrew Grant, Air Marshal Albert Durston, Air Vice-Marshal John J. Conybeare, R.A.F.V.R.

D.B.E. (*Military*).—Lady Ruth Mary Eldridge Welsh, Air Chief Commandant, W.A.A.F.

C.B.E. (*Military*).—Air Commodores L. K. Barnes, W. C. Cooper, A. P. Ledger, P. C. Livingston, W. G. W. Prall, F. A. Skoulding, the Rev. J. A. Jagoe, O. W. de Putron, E. D. D. Dickson, R. F. Osborne, V. B. Ranford, R. E. de T. Vintras.

Group Captains C. R. S. Bradley, H. W. Capener, A. W. Gray, W. H. Hutton, J. V. Mason, C. Rapley, G. N. J. Stanley-Turner, N. T. Goodwin, R.A.F.V.R., J. H. Green, G. P. Marvin, C. L. Stubbs, R.A.F.V.R., H. J. Wilson.

Wing Commander J. L. Barker.

Matron-in-Chief Gladys Taylor, Princess Mary's R.A.F. Nursing Service.

Service in South-East Asia.

On 23rd May, the following awards were announced in recognition of distinguished services in South-East Asia :—

G.C.B.—Air Chief Marshal Sir Keith Rodney Park.

C.B.E.—Acting Group Captain J. A. C. Fuller.
Wing Commander J. B. G. Bradley, R.N.Z.A.F.

The fol owing award was notified on 28th May :—

C.I.E.—Air Vice-Marshal G. E. Gibbs.

Personnel

Reserve Command.—The R.A.F. Reserve Command was formed on 1st May under an Air Vice-Marshal (see Appointments). It was stated that this would be followed by the formation of six regional groups, each under an Air Commodore. An announcement

would be made as soon as reserve training could be restarted. For the present, balloon squadrons would not be included in the command. In view of the speed of aircraft to-day and of the development of new weapons, future policy in regard to balloon defences had not yet been decided.

SERVICE CONDITIONS.—In the current financial year it is proposed to spend £1,000,000 to improve the standard of accommodation at about eighty R.A.F. stations in this country, and another £1,000,000 on the building of additional married quarters. The first step will be to improve conditions at temporary stations which are being retained, and at older stations which were extended during the War.

R.A.F. CINEMA CORPORATION.—It was announced on 11th June that the formation of a Royal Air Force Cinema Corporation to provide entertainment within the Service had been approved by the Air Council. It will be established on commercial lines, staffed by civilians, and financially self-supporting. Five members of the Air Council will act as governors, and an executive committee composed of representatives of all ranks of the R.A.F. and of the cinema industry will act as the board of management, with Mr. D. E. Griffiths, of the Kinema Renters' Society, as Vice-Chairman. The Corporation will not produce films, but will rent them from the trade.

RETIRED PAY AND PENSIONS.—The Air Ministry announced on 9th May that officers and other ranks of the R.A.F. who were awarded service retired pay and pensions before 19th December, 1945, and who have given full-time service in the armed forces in the 1939-45 war will receive increases for their 1939-45 war service. An other rank pensioner will receive an increase to his original pension equal to the difference between the pensions for which he would have been eligible as calculated under the old and new codes on the whole of his service, including full-time service while a pensioner. Rank held during his pensioner service will also be taken into account.

Retired officers will receive as an addition to the original retired pay a proportion of the difference between (*a*) the retired pay rates which they would have received under the new code had their service continued without a break beyond their retirement for the period of their re-employment, and (*b*) the existing rate of retired pay. The proportion of the difference added will vary according to whether or not they were in receipt of a bonus in addition to their normal pay and allowances of rank. The maximum period of war service which any officer may reckon is six years.

GENERAL

Air Chief Commandant Lady Welsh, Director of the Women's Auxiliary Air Force, visited all W.A.A.F. units in the British Air Forces of Occupation from 7th to 21st May.

The R.A.F. left Iceland at the end of April, except for about sixty technicians who remain for a time at the request of the Icelandic Government to assist in manning the Reykjavik airfield built by the British during the War.

Two war-time groups, Nos. 26 and 60, which were jointly responsible for R.A.F. signals telecommunications and radar in Great Britain, were dissolved on 25th April.

An invitation was accepted from the United States Army Air Force to send No. 35 Squadron of the R.A.F. Bomber Command to visit the United States to take part in Air Forces Day on 1st August. Group Captain R. C. M. Collard, Station Commander at Gravely, Huntingdon, was in charge of the operation, with Wing Commander A. J. L. Craig in command of the squadron.

DOMINIONS AND COLONIES

AUSTRALIA

AWARDS.—The following officers have been awarded the C.B.E. in recognition of conspicuous service in operations against the Japanese: Air Commodore A. M. Charlesworth, A.F.C., R.A.A.F., Acting Air Commodore A. L. Walters, R.A.A.F., and Group Captain A. M. Murdoch, R.A.A.F.

EMPIRE CO-OPERATION.—Air Chief Marshal Sir Keith Park, who arrived in Sydney in June, outlined the British Air Ministry's proposals for Empire co-operation which he was to discuss with the Australian authorities. He emphasised that the proposals were tentative, but had been generally approved by the New Zealand authorities. Among them were the following: (1) That Britain should maintain and expand her R.A.F. training establishments, covering flying training, navigation, the use of radar, bombing and gunnery; (2) that Dominion Air Force personnel should attend courses at R.A.F. training establishments; (3) that there should be a regular interchange of R.A.F. and Dominion Air Force personnel; and (4) that the same aircraft, operational technique, and equipment should be used by all Empire air forces.

AUSTRALIAN "VAMPIRES."—Australia is to build 600 m.p.h. de Havilland "Vampire" fighters, with the latest Rolls-Royce gas turbine (jet-propelled) engines. Air frames will be built at the de Havilland works at Bankstown, Sydney, and the Commonwealth Aircraft Corporation will make the engines on licence at Fishermen's Bend, Melbourne.

NEW ZEALAND

CHIEF OF AIR STAFF.—It was announced at Wellington on 15th May that Air Vice-Marshal Sir Leonard Isitt had relinquished the post of Chief of the Air Staff and had been appointed Chairman of the New Zealand National Airways Corporation, which will control airways under the plan for nationalization passed by Parliament.

EMPIRE CO-OPERATION.—Air Chief Marshal Sir Keith Park arrived in New Zealand at the end of May (his first visit since he left as a lance-bombardier in 1914), to discuss questions of air co-operation. In a statement to the Press, he said that the United Kingdom would continue Empire air schools, to which the Dominions could send men for courses. "We want," he said, "to keep this Empire air spirit, so that we get standardization in tactics, technique, equipment and training, making the whole thing interchangeable, as one of the greatest assets of the Air Force was flexibility."

BIRTHDAY HONOURS.—Honours conferred on the occasion of the observance of the King's birthday on 13th June included the following:—

C.B.—Air Commodore A. de T. Nevill, C.B.E., R.N.Z.A.F.

C.B.E.—Acting Air Commodore M. W. Buckley, M.B.E., R.N.Z.A.F.

CANADA

BIRTHDAY HONOURS.—The following were included in the King's Birthday Honours on 13th June:

C.B.—Air Vice-Marshals W. A. Curtis, C.B.E., D.S.C., K. M. Cuthrie, C.B.E., A. L. Morfee, C.B.E., and G. V. Walsh, C.B.E.

C.B.E.—Air Commodores J. G. Bryans, O.B.E., M. Costello, O.B.E., H. B. Godwin, O.B.E., J. G. Kerr, A.F.C., W. A. Orr, O.B.E., and A. D. Ross, G.C., O.B.E.

FOREIGN

RUSSIA

The *Aeroplane* says that it is reliably reported that German scientists are assisting in the development of Russian aviation. The Russians have flown at least two highly developed jet aircraft. The engines are axial-flow units which on the test bench have developed a static thrust of the order of 6,000 lb. and are close copies of the German units. One airframe which is also based upon German experience is said to have been made at the former Junkers factory at Dessau. The other is thought to have been assembled and reconstructed in Russia.

UNITED STATES

NEW MILITARY AIRCRAFT.—Details have now been published of the new Army Flying Wing bomber—the XB.35. Designed and built by Northrop Aircraft at Hawthorn,

California, it is shaped like a large boomerang with no fuselage or exposed engine nacelles. Crew, engines, fuel and armament are housed inside the wing. The crew's quarters are pressurized.

The span is 172 feet and the centre width 37ft. 6 ins. The normal gross load is 162,000 lbs. but the aircraft is designed to fly with an overload of 209,000 lbs. The empty weight is 89,000 lbs. and the usual load available for fuel and bombs is 73,000 lbs. The range is over 10,000 miles, comparing with the world distance record of 8,198 miles set up by a B.29 last November. Four Pratt and Whitney Wasp Major engines each drive a pair of counter-rotating four-bladed propellers on the rear of the wing. They are credited with an emergency rating of 3,000 horse power, but are expected to be able to produce over 3,650 h.p.

An outstanding feature of the Wing is the use of "elevons" as controls. These do the work of the elevators and ailerons. The rudder is replaced by clam-shell flaps near the wing tips which when opened create a drag and turn the aircraft.

The Army Air Force have ordered fifteen of these aircraft the first of which is to cost $13,000,000. It is probable that one of the future models will be converted to jet power.

The normal crew of nine includes two pilots, a navigator, an engineer, a radio operator, a bombardier and three gunners, with accommodation for six spare crew.

REVIEWS OF BOOKS

GENERAL

Speaking Generally. By Field-Marshal Viscount Wavell. (Macmillan & Co. Ltd.). 7s. 6d.

Lord Wavell here gives us a collection of wartime broadcasts, orders and addresses—practically the whole of his public utterances—during the period of his tenure of office as Commander-in-Chief in the Middle East (1939-1941) and in India (1941-1943). They are published as they were written and, to quote from the author's Preface, " they give a reasonably clear picture of the outlook of one in high military position during four years of war, rather grim years .... Each reflects the feeling of the moment. In this way they may help to give a background to history .... The very mistakes and misconceptions help to give colour."

About half the book consists of addresses to the National Defence Council of India. At the head of each address is not only the date of its delivery, but also a short summary of the war situation at the moment.

Written with Lord Wavell's customary skill, this book is most interesting reading. It also contains in clear, simple language much military wisdom profitable for everyone to imbibe.

Atomic Energy for Military Purposes. By H. D. Smyth. (Oxford University Press.) English price 12s. 6d.

This is the official report on the development of the atomic bomb under the auspices of the United States Government, 1940–1945, published in America by the Princeton University Press. Military security prevents the story being told in full, but this book makes known to the general public the administrative history of the atomic bomb project and the fundamental scientific knowledge on which the several developments were based.

NAVAL

Portsmouth Letters. By Admiral Sir W. M. James. (Macmillan & Co.) 10s. 6d.

To record personal experiences of, and views on, great events in the form of letters gives scope for personality to colour what might otherwise be a much drier chronology. Admiral James takes full advantage of this method in a commentary covering his time, from the outbreak of war to October, 1942, as Commander-in-Chief, Portsmouth and afterwards as Chief of Naval Information at the Admiralty when he was also M.P. for North Portsmouth. The result is a very readable little volume.

It does not add much that is new to our knowledge of major operations, but it provides a vivid and human account of the activities within one of the great Home Commands in wartime and, incidentally, of the difficulties which at times the writer had to contend with in his dealings with a seemingly unresponsive and dilatory Admiralty. We see recurring instances of the slow and reluctant movement of machinery which is constitutionally civilian rather than naval, even in wartime, in such examples as the delay in providing the financial support needed to keep the " Mercury " training establishment going, the ponderous and procrastinating development of the W.R.N.S. until removed from the administration of a Civilian to a Naval department, and the " extraordinary story " of the mulcting of the pay of Royal Yachtsmen called in for general service. It leaves a strong impression that that machinery needs a drastic overhaul.

The author's thumbnail sketches of the many interesting people in high places he met are occasionally critical, but generally kindly—as is his way. For the welfare of those in humbler circumstances he was always working. In this he was energetically assisted by the popular lady so frequently referred to as R, and to whom this book is dedicated—his wife. His gifts of expression and apt quotation stood him in good stead on the many occasions when he had to appear in public, and the Service could not have had a better representative to inspire a large section of a community which had their full share of " enemy action."

J

MILITARY

Chindit Column 76. By W. A. Wilcox. (Longmans, Green & Co., Ltd.) 10s. 6d.

The author of this light-hearted and readable book was a journalist before the War, became an officer in the Royal Air Force, and in 1944 was liaison officer with No. 76 Column of the 2nd Battalion, The Duke of Wellington's Regiment—part of the "Chindits" operating in Burma. High tribute is paid to all ranks of the Chindits. Local colour and atmosphere are well portrayed, and the book may well be read as a supplement to Brigadier Fergusson's lecture which is published in this number of the Journal.

Heraldry in War: Formation Badges, 1939–1945. Collected and illustrated by Lieut.-Colonel H. N. Cole, O.B.E. (Gale and Polden, Ltd.) 12s. 6d.

Formation badges worn in the Army during the late war are here shown by illustrations, together with short descriptions. Regimental badges are not included and the badges described are confined to those of formations from brigades upwards. The collection seems to be comprehensive, but the author expressly states that he cannot hope to have included every formation badge that was worn. The book is a useful record.

Rhino Review: Souvenir Number.

Rhino Review was the news sheet of the 11th East African Division. It was published daily in the field and distributed within the Division. The Souvenir number here under notice recalls the part played by the Division in the Burma campaign of 1944. These operations, which began in August, 1944, and ended with the capture of Kalewa and the establishment of a bridge-head over the Chindwin river in December, 1944, opened the way to final victory over the Japanese in 1945. It is not generally known that in one period of the fighting one third of the British forces in contact with the Japanese were African. The record of the African troops is a fine one.

The souvenir number is attractively got up, well illustrated, full of information and most readable throughout. It will interest especially all who were or are connected with our African forces. Copies can be obtained from the East African Office, Grand Buildings, Trafalgar Square, W.C.2—price 1s. 6d. or 2s. post free.

AIR

Jet Flight. By John Grierson. (Sampson Low, Marston & Co.) 18s.

This book, written by the test-pilot, is the story of the invention, development, and record-breaking flight of jet aircraft. Mr. Grierson tells us of the rebuff of the young inventor by a non-technical and therefore short-sighted Air Ministry; the years in which only the idea of the jet grew; the formation of a small private company; Government interest seven years late; the short life and sudden death of gallant young pilots; the long, slow toil of development, beset with unexpected impediments; and finally complete success and the world's speed record, but with little reward for the inventor and his associates.

The frontispiece shows Cadet Frank Whittle, "small of stature but able to wrestle with mathematics and the more abstruse problems of science," who was sent to interview the Air Ministry in 1929 by Group Captain (now Air Marshal Sir John) Baldwin. He was turned down flat. His first patent in 1930 must have been read with great interest in Germany, but it does not seem to have done them much good. Financial aid came in 1935 from a group of men, one of whom succeeded in interesting a firm of investment bankers. "Among this company's interests," we are told, "was the promotion of companies for the development of new processes which appealed to them rather on the grounds of national necessity than of financial benefit . . . important inventions liable either to be ignored or sold abroad because the Government would not give them any

backing." For years, however, Whittle and his men strove with the difficulties of design and production, and the assistance given them first by industry and then by their devoted band of test pilots was incalculable. Turbine blades and bearings was one of their greatest problems. Eventually manufacture was taken on by Rolls-Royce, when "the initial weaknesses were weeded . . . combustion was improved, better material was found for turbine disc and bearings, and methods of sealing bearings off from the hot blast of the turbine gases were developed to the point of first-class reliability." Eventually, in the R.A.F. the maintenance was found to be 40 per cent. less than that of the Rolls-Royce Merlin; and engine change took only six hours. From other sources it is known that the time between overhauls exceeds 500 hours, thirty times as long as that for corresponding German engines. So the gas turbine for aircraft arrived.

The story of jet flight, as distinct from that of the gas turbine, begins with a visit by Mr. George Carter, of Gloster, to the Power Jets factory in 1939. A contract for the first Gloster-Whittle aircraft was placed in February, 1940; it was officially styled E.28/39, but Whittle and the other pilots called it "Pioneer." It is now in the South Kensington Museum. Development of the aircraft was as difficult as that of the engine. There was no vibration in flight, and no engine and propeller torque; but the lack of propeller slipstream together with higher speeds than ever before resulted in instability of rudder and elevator controls, followed by a series of test flights in which 55 out of 100 had to be devoted to aileron problems. The low drag resulting from the absence of the turbulence due to the propeller gave aircraft higher speeds than those calculated; but landing speed was high owing to the considerable thrust of the jet even when throttled back, and brakes wore out very rapidly. Perhaps we shall be forced into using retractable skids; there is an illustration of a German rocket aircraft which lands in this way.

The De Havilland Goblin engine and the Vampire aircraft, first mooted at M.A.P. in 1941, grew together. Both the engine and the aircraft designers wanted a single engine, and a powerful one at that—"more powerful than any of the others which were known to be under development at the time." They chose the shortened jet-pipe for higher jet efficiency and a reduction in skin area of the fuselage giving less drag. Construction of the Vampire coincided almost exactly with that of the Lockheed Shooting Star in America; and it should be on record that when the De Havilland engine sent to the United States was damaged by the Lockheed air intake being unable to withstand the suction and collapsed, De Havilland at once sent to their rivals the engine intended for Vampire No. 2, then called "Spider Crab," even though it delayed their own progress. A minute sent by Mr. Winston Churchill to the then Minister of Aircraft Production, Sir Stafford Cripps, congratulates De Havilland on their record flight of 506 miles per hour; it is dated 30th May, 1944. On 3rd December, 1945, the Vampire achieved the distinction of being the first jet aircraft to land on and take off from an aircraft carrier, which it did under rough conditions.

What of the future? Many of our questions are answered in a technical chapter written by Mr. George Carter. Civil aircraft will not be ready for jet propulsion until a cruising speed of more than 450 miles an hour is in sight; but turbine driven propellers in "a future 30/40 tonner cruising at an average of 400 miles an hour make an attractive target for early stages of development." With high landing speeds, reversible propellers have the great advantage of powerful braking. Carter refers to the advantages of all-wing or tail-less aircraft, and since the book was written the first jet aircraft of this type has been produced by De Havilland, and is styled the Ghost.

The last chapter of the book deals with the record flight speed of 606 miles an hour, on 7th November, 1945, by Group-Captain Wilson, flying a Meteor IV with Rolls-Royce Derwent V engines.

There is a foreword by Lord Beaverbrook, a glossary of technical terms, and an excellent index to complete what is likely to be a work of reference for years to come.

I Hold My Aim. By Group Captain C. H. Keith. (George Allen & Unwin, Ltd.) 10s. 6d.

The title of this book was the motto of the Central Gunnery School at Sutton Bridge which Group Captain C. H. Keith commanded in 1942. It provided post-operational training for fighter pilots and gunners.

Group Captain Keith, either as pilot or expert, is well fitted to write on the subject of armaments, which includes bombs, machine guns, ammunition and bomb sights. From 1923 until his retirement in 1943 he was almost continuously employed on armament work.

Bombs are briefly covered. The achievements of Bomber Command form a fitting tribute to the "backroom boys" who increased the size and weight of bombs more than a thousandfold, very largely in the period from Munich onwards; but whether the bomb was an old-fashioned 250 lbs. one, or a 22,000 lb. earthquake type, the construction, the method of detonation and the technique of bomb aiming are all much the same. In these early chapters, illustrations show why a bomb remains safe while it is being loaded on the aircraft, even though it might be accidentally dropped a few feet during this process. Two other illustrations show the difference between light case and armour piercing bombs; and the text details the necessity of release at great height in order to obtain penetration, as for example through the armour-plated deck of a warship or a concrete submarine hide-out. The method of aiming, the use of a bomb sight and the operation of delayed action bombs are all dealt with.

There are interesting references to the development of incendiary bombs, including the ingenious fire-pot, which threw incendiaries in all directions with what is styled "a useful all-round effect."

The development of machine guns and ammunition is very fully dealt with; unfortunately, in 20 years no gun of British design emerged in sufficient time to be used by the Royal Air Force in war; and the author seems to have visited almost every country in Europe in order to find a type which would stand up to arduous R.A.F. service and yet be capable of manufacture by mass production methods.

On page 78, the author records a historic conference initiated by himself, with the then Air Commodore Tedder in the chair. This was in July, 1934, and it met to consider Group Captain Keith's recommendations that aircraft for the next war would have to carry four times as many machine guns as in the past. This conference was the genesis of the eight-gun fighter, each gun to be capable of firing at 1,000 shots a minute. The order for eight-gun fighters was ridiculously small, but as the sands ran out and both aircraft and armament factories got into their stride, quantity and quality of aircraft and guns combined to provide us with the Hurricane and Spitfire to which we owe victory in the Battle of Britain.

To British readers in particular the chapters on the development of power-operated turrets will be of the greatest interest. In the later stages of the war we heard of aircraft with two or four turrets which might be operated by a single air gunner using not a gun but a sight, all guns and turrets being remotely controlled.

Lastly in order of development, there is a fine chapter on "the King of Guns." On page 89 the author says that to penetrate fuel tanks, locomotives, or even submarines, the so-called cannon would be necessary; and when this was realized our interest in 20-mm. machine guns became intense. We might have adopted the ½ in. Browning; but the 20-mm. is nearly 0.8 in. The suggestion that the Hispano gun should be inspected came from Squadron Leader Tom England; and the gun proved not only efficient in all its trials but capable of mass production in a British factory. "The lease for the land upon which the factory was built was signed by Mr. W. Dennis Kendall, M.P. for Grantham, in June, 1938, and his factory was up and working with their first English made gun ready to be fired, in December of the same year."

The book closes with an attempt to peer into the future, to weapons which we have recently been informed may be more terrible than the atom bomb. A book such as this deserves an index.

ADDITIONS TO THE LIBRARY

GENERAL

THE TWENTY-FIRST QUARTER. By Philip P. Graves. 8vo. (Hutchinson 1946.) 12s. 6d.

THE ARAB AWAKENING. By George Antonius. 8vo. (Hamish Hamilton 1945 Edition.) 12s. 6d.

HENRY THE NAVIGATOR. By Elaine Sanceau. 8vo. (Hutchinson 1946,) 16s.

NORMANDY TO THE BALTIC. By Field-Marshal Viscount Montgomery. 8vo. (Private 1946.) Presented by the Author. (This book cannot be sent out on loan.)

THE ENGLISHMAN AND THE RIFLE. By Colonel Lord Cottesloe. 8vo. (Jenkins 1946.) 12s. 6d. Presented by the Publishers.

THE TWENTY-SECOND QUARTER. By Philip P. Graves. 8vo. (Hutchinson 1946.) 12s. 6d.

A CONTINENT EXPERIMENTS. By The Hon. C. B. Birdwood. 8vo. (Skeffington 1946.) 21s. A study of the Indian Political and Social Scene by an officer of many years experience.

BRITAIN UNDER THE ROMANS. By S. E. Winbolt. (Pamphlet by Pelican Books 1945.) 1s. Among other things a good study of the Roman Army, its Organisation, Camps and Forts.

THE ENEMY WITHIN. By John Watney. 8vo. (Hodder and Stoughton 1946.) 10s. 6d. An autobiography in the same style as " All Quiet on the Western Front."

MISS FIRE. By Jasper Rootham. 8vo. (Chatto and Windus 1946.) 12s. 6d. The Chronicle of a British Mission to Mihailovich 1943-44.

HERE WE ARE TOGETHER. By Robert S. Arbib, Jr. 8vo. (Longmans 1946.) 7s. 6d. The notebook of an American Soldier in Britain, and one of the best descriptions yet written of everyday life in this country during the war years.

GREAT BRITAIN AND PALESTINE, 1915-1945. 8vo. (Royal Institute of International Affairs 1946 Edition.) 7s. 6d.

IN MY TIME. By Field-Marshal Lord Birdwood. 8vo. (Skeffington 1946.) 10s. 6d.

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TEN CHAPTERS. By Field-Marshal Viscount Montgomery. (Hutchinson 1946.) 5s.

THE STORY OF BURMA. By F. Tennyson Jesse. 8vo. (Macmillan 1946.) 10s. 6d.

CHINDIT COLUMN 76. By W. A. Wilcox. 8vo. (Longmans 1946.) 10s. 6d. Presented by the Publishers.

SOUTH TO FREEDOM. By The Hon. T. C. F. Prittie and Captain W. E. Edwards. 8vo. (Hutchinson 1946.) 21s. A book of escapes from Prisoner of War Camps, which may take its place alongside such classics as " The Road to Endor " and " The Escaping Club."

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THE DARK SIDE OF THE MOON. (Anonymous Author.) 8vo. (Faber and Faber 1946.) 12s. 6d. An account of the relations between Poland and the U.S.S.R., from 1939-1945, partly compiled from material supplied by the late General Sikorski. It has a preface by T. S. Elliot.

MONSOON VICTORY. By Gerald Hanley. 8vo. (Collins 1946.) 10s. 6d. An account of the operations by the 11th East African Division in the Burmese Campaign.

REPORT BY THE SUPREME COMMANDER TO THE COMBINED CHIEFS OF STAFF ON THE OPERATIONS IN EUROPE OF THE ALLIED EXPEDITIONARY FORCE, 6 JUNE, 1944—8 MAY, 1945. (H.M. Stationery Office 1946.) 2s. 6d.

THE EFFECTS OF THE ATOMIC BOMBS AT HIROSHIMA AND NAGASAKI. Report of the British Mission to Japan. (H.M. Stationery Office 1946.) 1s.

HERALDRY IN WAR. By Lieutenant-Colonel Howard N. Cole. 8vo. (Gale and Polden 1946.) 12s. 6d. Presented by the Publishers.

WHO'S WHO 1946. (Adam and Charles Black 1946.) 80s.

L'ALLEMAGNE. Par Edmond Vermeil. 8vo. (Gallemard, 9e edition). 195 frs. Presented by the British Council.

OCEAN FRONT. The Story of the War in the Pacific 1941-1944. (Brochure by H.M. Stationery Office 1945.) 1s. Photographs and Maps.

LIVRUSTKAMMAREN. Journal of the Royal Armoury, Stockholm. (June 1946.) Presented.

DER SCHWERTFEGER GOTTFRIED LEYGEBE. Von Ada Bruhn. (Nordlundes Bogtrykkeri, Kopenhagen, 1945.) Presented.

KANONHALLEN. (Tojhusmuseets Vejledninger, Kobenhavn 1946.) Presented.

DANISCHE ORGELESPINGOLEN MIT EINHEITSPATRONEN 1850-1877. Von Egon Eriksen. (Nordlundes Bogtrykkeri, Kopenhagen 1945.) Presented.

CERTAIN PHASES IN THE ORIGIN AND DEVELOPMENT OF THE GLAIVE. By Martin Elbehauge. (Nordlundes Bogtrykkeri, Kopenhagen 1945.) Presented.

DET KONGELIGE PARTIKULAERE RUSTKAMMER. Udgivet af Tojhusmuseet ved Otto Smith. (J. D. Qvist and Komp, Kobenhavn 1938.) Presented.

BRITISH RULE IN BURMA. By G. E. HARVEY. 8vo. (Faber and Faber 1946.) 10s. 6d.

THE GROWTH OF MODERN GERMANY. By Roy Pascal. 8vo. (Cobbett Press 1946.) 7s. 6d.

SULEIMAN THE MAGNIFICENT. By Roger B. Merriman. 8vo. (Harvard University Press 1944.) $3.50.

SHORT MANUAL OF THE AMHARIC LANGUAGE. (Macmillan 1946 Edition.) 7s. 6d. Presented by the Publishers.

A YEOMAN'S LETTERS. By P. T. Ross. 8vo. (Simpkin Marshall 1901.) Presented by Miss Rose. Letters written from South Africa during the War and illustrated by the Author.

THE LEAGUERS OF LADYSMITH. 2nd November, 1899—28th February, 1900. By Captain Clive Dixon, 16th Lancers, A.D.C. to General Sir George White, V.C. (Eyre and Spottiswoode 1900.) Presented by Miss Rose. Narrative and sketches by the Author.

T.P.'s JOURNAL OF GREAT DEEDS OF THE GREAT WAR. Vols. I and II. (T.P.'s Journal Publishing Company Ltd., 1914-15.) Presented by Miss Rose.

HISTORY OF THE GREAT WAR. Order of Battle of Divisions. Part 3 B. New Army Divisions (30-41) and 63rd (R.N.) Division. (H.M. Stationery Office 1946.) 10s. 6d.

HISTORY OF THE GREAT WAR. Order of Battle Part 4. The Army Council, G.H.Q.s, Armies and Corps 1914-1918. (H.M. Stationery Office 1946.) 21s.

BRITISH SECURITY. By A Chatham House Study Group. 8vo. (Royal Institute of International Affairs 1946.) 8s. 6d.

THE CONGRESS OF VIENNA. By Harold Nicholson. 8vo. (Constable 1946.) 18s.

ATOMIC ENERGY FOR MILITARY PURPOSES. The Official report on the Development of the Atomic Bomb under the auspices of the United States Government 1940-1945. By Henry DeWolf Smyth. 8vo. (Princeton University Press 1946.) 12s. 6d. Presented by the Oxford University Press.

Extra Copies of each of the LONDON GAZETTES Nos. 37609, 37628 and 37638, containing General Sir Archibald Wavell's Despatches from August, 1939, to 15th July, 1941, are now available and can be sent out on request. Also available is London Gazette No. 37645 containing his Despatch on the operations in East Africa, November 1940—July, 1941 (to cover reports by Lieutenant-General W. Platt and Lieutenant-General A. G. Cunningham).

NAVAL

THE STORY OF THE W.R.N.S. By Eileen Bigland. 8vo. (Nicholson and Watson 1946.) 8s. 6d.

COMMISSIONED BARGEES. By Lieutenant-Commander Trevor Blore, R.N.V.R. 8vo. (Hutchinson 1946.) 18s. The story of the Landing Craft.

LOWER DECK. By John Davies. 8vo. (Macmillan 1946.) 7s. 6d.

SIGNAL CARD 1944. (H.M. Stationery Office.) 9d.

PORTSMOUTH LETTERS. By Admiral Sir W. M. James. 8vo. (Macmillan 1946.) 10s. 6d.

H.M. FRIGATE. By Nicholas Monsarrat. (Pamphlet by Cassell 1946.) 2s.

OUR NAVY AT WAR. Three Reports by Fleet Admiral Ernest J. King, Commander-in-Chief, United States Fleet and Chief of Naval Operations. (The United States News.) Presented.

J.-B. CHARCOT, LE "POLAR GENTLEMAN." Par Marthe Emmanuel. 8vo. (Editions Alsatia 1945.) Presented by the British Council.

THE CAMP MAGAZINE, GRONINGEN, HOLLAND, being the periodical of the 1st Royal Naval Brigade interned in Holland. Nos. 1-21, 1915-1916. Presented by the Essex County Library, Wanstead and Woodford Branch.

RUSSIAN WAR, 1855, BLACK SEA. (Publications of the Navy Records Society, Vol. LXXXV. 1945.)

MILITARY

SO FEW GOT THROUGH. By Martin Lindsay. 8vo. (Collins 1946.) 12s. 6d. The Author's experiences with 51st Division during the Battle of Normandy.

HISTORIQUE DE LA 1ERE BRIGADE D'INFANTRIE "LIBERATION." Official typescript of the Belgian Forces which fought with the British Army in various theatres of War 1939-1945. Presented by the Belgian Military Attaché. (To MSS Room).

COME TO DUST. By Robin Maughan. 8vo. (Chapman and Hall 1946.) 7s. 6d. An autobiography of the Desert War.

WITH THE ALLIED ARMIES IN ITALY. By Edward Seago. 8vo. (Collins 1945.) 15s.

A HISTORY OF THE 11th ARMOURED DIVISION. 8vo. (Private.) Presented by Major-General G. P. B. Roberts and All Ranks, 11th Armoured Division.

BIENNIAL REPORT OF THE CHIEF OF STAFF OF THE UNITED STATES ARMY FOR JULY 1ST, 1943—JUNE 30TH, 1945, TO THE SECRETARY OF WAR. (H.M. Stationery Office 1945.) 2s. 6d.

HARD POUNDING. By Lieutenant-Colonel G. D. W. Court, R.A. 8vo. (The U.S. Field Artillery Association 1946.) $2.50. Presented by the Publishers. The Tactics and Technique of Anti-tank Warfare with observations on its past, present and future.

THE HISTORY OF THE VOLUNTEER INFANTRY OF HUDDERSFIELD AND ITS VICINITY FROM 1794-1874. By Robert Potter Berry, Lieutenant, 6th West Yorkshire Rifle Volunteers. 8vo. (J. Broadbent & Co., Huddersfield, 1903.) Presented by Major-General H. W. Higginson, C.B., D.S.O.

LES ARMIES FRANCAISES DE 1940. Par Général Gamelin. 8vo. (Libraire Plon 1946.) 150 frs. Presented by the British Council.

LA CROSIERE HEROIQUE. Par Raymond Beau. (Recueil Sirey 1946.) Presented by the British Council. An Account of four years of war on all fronts, from Lake Chad to Strasbourg and from Bir-Hakim to Paris. Illustrated.

WAR-TIME TANK PRODUCTION. Reports by the Select Committee on National Expenditure and the Replies to these Reports by the Government of the day. (H.M. Stationery Office 1946.) 1s.

THE INFANTRY INSTRUCTOR. By Captain E. W. Short, The Durham Light Infantry. (Pamphlet by Gale & Polden 1946.) 2s. 6d. Presented by the Publishers.

AIR

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JUNGLE PILOT. By Barry Sutton. 8vo. (Macmillan 1946.) 6s.

LAST FLIGHT FROM SINGAPORE. By Arthur Gerald Donahue. 8vo. (Macmillan 1944.) 8s. 6d. A Story by one of the first Americans to fly with the R.A.F. After the Battle of Britain, he was wounded in the Pacific War, but recovered to fly again. He was eventually lost on dawn patrol in October, 1942, over the Dutch Coast.

THIRD REPORT OF THE COMMANDING GENERAL OF THE U.S. ARMY AIR FORCE TO THE SECRETARY OF WAR. (Pamphlet printed by H.M. Stationery Office 1946.) 2s.

AMERICA FACES THE AIR AGE. VOL. I. THE GEOGRAPHY OF WORLD AIR TRANSPORT. By J. Parker van Zandt. 8vo. (The Brookings Institution 1944.) $1.00. The first of a series of three volumes on the coming air age.

AMERICA FACES THE AIR AGE. VOL. II. CIVIL AVIATION AND PEACE. By J. Parker van Zandt. 8vo. (The Brookings Institution 1944.) $1.00.

I HOLD MY AIM. By C. H. KEITH. 8vo. (Allen and Unwin 1946.) 10s. 6d. Presented by the Publishers. The development in the past, and the possibilities for the future, of air armament.

HISTORIES AND RECORDS OF THE HOME GUARD

An official request has been circulated for copies of histories and records compiled by the various units of the Home Guard to be sent to the Library of the Institution.

In order that full information may be available in years to come about the constitution and achievements of that Force, it is hoped that all units will respond to this request.

The Council have pleasure in acknowledging further histories or records up to the date of issue of this Journal from the following :—

1st (Loyal City of Exeter) Battalion, Devonshire Home Guard.
1st Berkshire (Abingdon) Battalion, Home Guard.
"G" Company (Beccles), 1st Suffolk Battalion, Home Guard.
40th County of London (G.L. & C.Co.) Battalion Home Guard (Technical Companies.
2nd City of London (Civil Service) Battalion Home Guard.
4th Oxfordshire (Bullington) Battalion, Home Guard.
63rd Surrey (Richmond) Battalion, Home Guard.
19th (Farningham) Battalion, Kent Home Guard.
No. 7 Platoon, 14th Staffordshire Battalion, Home Guard.

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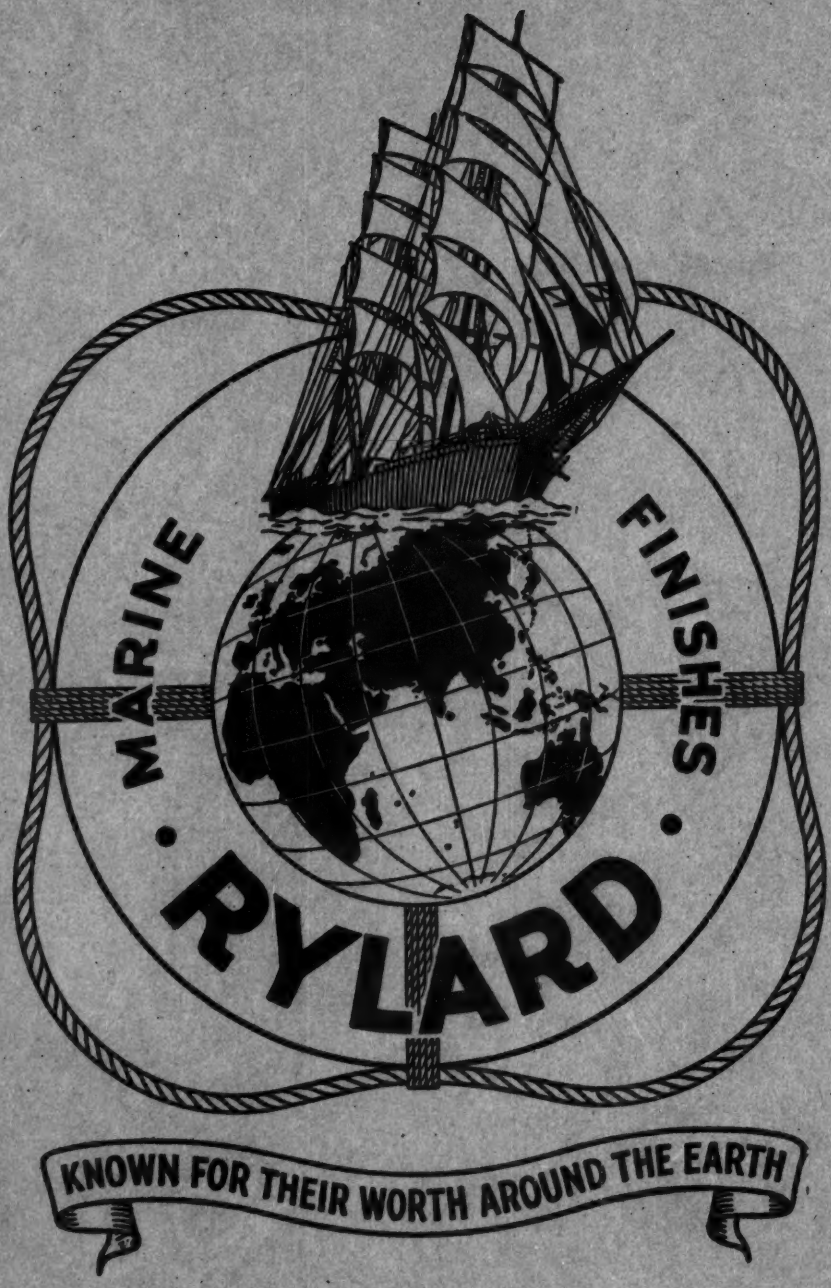
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8/9

8 out of every 9 British Naval Aircraft were Fairey types

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